



Railway Age

Vol. 83 October 15, 1927 No. 16



An A. C. L. Train (Left) and a F. E. C. Train at Jacksonville, Fla.

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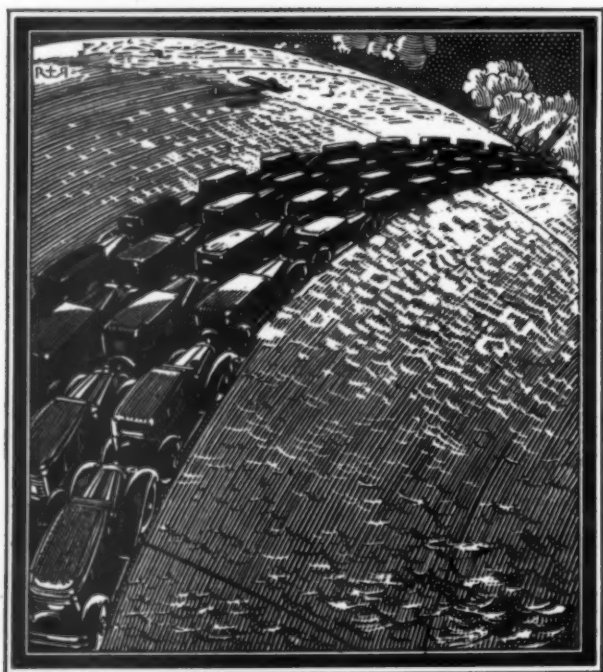
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Railway Age

Vol. 83, No. 16

October 15, 1927

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Improved Signal Performance

WITH the rapid increase in the efficiency of train operation during the last few years, the elimination of train stops is receiving more attention. Among the causes for train stops, those due to defective signal equipment are most easily eliminated and, therefore, are subject to the most severe criticism. By making a careful study of the causes of signal failures and by using this information in a definite program to teach the maintainers to make inspections that will locate and eliminate the causes of potential failures, many roads are gradually raising the standards of maintenance. For example, on the Union Pacific the traffic has increased in ten years so that the number of signal movements has risen from 56,771,071 in 1915 to 80,782,813 in 1925, while in the same period the number of interruptions to train movements has decreased from 1,038 to 438. Likewise the Erie, with 1,053 miles of road equipped with automatic signals, reduced the number of interruptions due to signal failures from 2,175 in 1917 to 522 in 1925. Many roads can not show as great improvement in signal performance as those cited, but in any event railroad managements should now gage the number of signal failures in terms of train stops and an investigation on this basis may lead to the introduction of better methods.

The Price We Pay

IT is, no doubt, dangerous to attempt direct comparisons of railway operations in different countries unless the comparisons are accompanied by a careful study of all of the conditions, variations in which as between the two countries may exert major influences in the operating results. Even at the risk of being open to the charge of attempting no such careful study of all of the conditions affecting the difference in results, however, certain phases of British passenger train operation as exemplified by the recent extension of the non-stop run of the "Royal Scot" express train of the London, Midland & Scottish to a total length of 299.5 miles between London and Carlisle, are worth noting. This run, a brief account of which will be found elsewhere in this issue, is made with 15 cars, 12 of which are fully or partially devoted to seating accommodations for passengers, hauled by a 10-wheel locomotive which develops 33,150 lb. tractive force and has a total evaporative heating surface of 2,081 sq. ft., with a superheater area of 445 sq. ft. and a grate area of 31.2 sq. ft. The train seats 450 passengers and weighs approximately 420 (long) tons. The tender of the locomotive has a rated capacity of but 5½ (long) tons of coal. Assuming that the entire tank of coal was burned on this run, the amount of fuel per car-mile would be less than 3 lb. In America, a train to accommodate approximately the same number of passengers in approximately the same service would hardly

weigh less than 1,000 (short) tons, and would burn at least twice as much coal in an average run of equivalent distance. Whatever advantages there may be in the tremendous weights of American passenger cars, they certainly cannot be considered as entirely unmixed blessings.

Psychologists and Safety

THE profession of psychology has grown rapidly within the past few years, but the field of industrial psychology, particularly as it appertains to railway safety, is still relatively untouched by the professional psychologists. It would be folly to attempt to install a professional psychologist without railway experience as general safety agent of a railway. But such psychologists would be of valuable assistance to the safety department, if they would devote their attentions to research work in the industrial and railway field. Every operating officer and safety agent can call to mind incidents of an old, reliable employee suddenly and inexplicably violating every rule of safety and endangering the lives of others as well as his own. It is most difficult to avoid such occurrences unless the reason for the action is known. One railway, which has attempted some research work along these lines, has made some astounding discoveries as to the causes of these sudden, apparently reasonless lapses. Family troubles, financial difficulties and a dozen and one other things have been found at the root of apparent carelessness. Yet, it has merely scratched the surface and it remains for some psychologist with ample time and facilities to investigate and analyze these so-called "unaccountable" actions, which produce accidents. Once the cause is discovered, the way will be open to finding the remedy.

Taking Over Smaller Roads

THE question of what will be necessary when, and if, in the course of consolidation, the larger railways take over smaller lines with the idea of opening up new traffic arteries, is answered to a large extent by the examples supplied by the Illinois Central and the St. Louis-San Francisco. Both these lines took over small railways in the same section of the country, the I. C. having acquired the Gulf & Ship Island to reach the Mississippi gulf coast and the Frisco the Muscle Shoals, Birmingham & Pensacola to get an outlet to the Gulf of Mexico. In both instances, an inspection prior to the purchase indicated that repairs amounting practically to rebuilding would be necessary before operations could be conducted on anything like the standards of the parent lines. The G. & S. I had managed to keep out of red figures usually, but very little of the returns ever found their way into the maintenance budget.

The M.S.B. & P., too, had expended very little for maintenance during its somewhat checkered history. Examples can be cited, of course, of relatively small railways whose physical condition is excellent, but the number of these is not large. After consolidations take place, in practically every instance, the trunk lines must be prepared to make large expenditures if they expect to operate these acquired smaller roads as secondary main lines in accordance with their own standards.

Reducing the Water Stops

IN considering the elimination of train stops as a means of expediting the movement of trains operating officers can well afford to consider the possibility of reducing the number of water stops. It is a common observation that many enginemen stop at every water station, and that, therefore, the more frequent the water stations are the more numerous are the stops. Each water stop involves a delay ranging from 15 minutes to an hour, depending upon the character of the train, the danger of pulling out drawbars, etc. A study of the practices in effect will show the possibility of "running" many water stations safely with present equipment. Still further progress may be made in this direction by the addition of larger tenders, an expedient which is being adopted by a number of roads. The possibilities in this direction far exceed the expectations of those who have not given this subject careful consideration. Indicative of what may be done is the recent action of one road in reducing the number of water stations on one division from 21 to 9, coincident with which it made a remarkable improvement in the speed with which trains move over its lines. On another equally well operated road, it is now the practice to run heavy tonnage trains over an entire engine district of 100 miles with only one intermediate stop for water, greatly increasing the regularity of its performance as well as the speed. The direct and immediate savings resulting from the abandonment of water stations justify study in this direction. The indirect savings, however, resulting from increased rapidity of train movement are still greater.

Union-Management Relationships in Britain

THE British "Railways Act of 1921," which provided for the reorganization of the properties into the four companies now operating them, contemplated widespread employee-management co-operation in promoting mutual interests. Local and district committees, composed of representatives of management and unions were set up, not only for the settling of disputes, but also as clearing houses for suggestions for improved efficiency and service. Apparently the constructive aspect of the activity of these committees has not as yet been extensively developed; a movement to stimulate it has now been initiated on the London, Midland & Scottish. Under the aegis of Sir Josiah Stamp, president of the company, a joint meeting of officers and union representatives was held in Liverpool on September 20 to formulate a plan of action for presentation to district and local committees. Among the matters which will first come to the attention of these committees are: Highway competition; operating costs (line haul and in terminals); switching and its effect on speed of service; damage to rolling stock; and accidents and their prevention. Sir Josiah in opening the Liverpool meeting commented on the loss of passenger business and lower

revenues in spite of rate increases. The principal railway unions are heartily supporting the co-operative plan and at the Liverpool meeting a resolution was adopted stating that the plan was in harmony with trade union policy and pledging the unionists to put forth every effort "to further the business interest of the L. M. S. Railway." A will to co-operate seems to be a natural reaction from industrial warfare. The present favorable status of employee-management relationships on American railroads had its beginning in the period of readjustment following the shopmen's strike. Is it not possible that the move toward co-operation in England has come as a result of sober thought induced by the great strike of last year? Strikes, like all warfare, are costly—and doubly so if no lesson is learned from them.

When to Buy Shop Tools

WHEN locomotive and car repair shops are operated under special pressure for economy, the tendency to get along as well as possible with old machines and tools is unquestionably carried too far at times. Take, for example, such equipment as a set of jacks for raising and lowering cars or locomotives in the performance of routine maintenance work. Many of the jacks now in daily use could with profit be consigned to the scrap pile. The reason they are not is because they function after a fashion and it is still possible to use them for the purpose intended. The fact that they waste time and physical effort, are subject to excessive cost of upkeep and may in some cases operate with a small factor of safety is not realized or is overlooked. Sometimes a "penny wise, pound foolish" policy compels the use of a jack for some purpose for which it is not designed and consequently is totally unfitted. Sometimes the lack of the self-lowering feature, for example, wastes not only the time and effort of the operator but the time of a gang of men as well who may be waiting for the car or locomotive to be dropped on its wheels. The shopman *knows* how much his work is being retarded and made difficult by tools which have outlived their usefulness, and often adopts the attitude, "If the management doesn't care to give me the proper tools, I don't care how long the work takes." Every railroad officer, familiar with shop conditions, will recognize this attitude of mind and appreciate its deadening effect on output. The old jack, typical of other shop tools and equipment, will have to be replaced some time and it is economy to make the replacement, not after the tool has given its last ounce of service, but just as soon as its continued use tends to make the shop output less than that obtainable with the highly efficient modern tools now available.

Rectifiers for Electric Locomotives

RECENT activity in the development of mercury-arc power rectifiers has led to speculation concerning the possibility of their use on electric locomotives to convert alternating to direct-current and thereby obtain the advantages of a high-voltage a.-c. trolley with the desirable operating characteristics of the d.-c. traction motor as is done by means of motor-generator locomotives. Such an application is possible, but seems scarcely practicable at the present time. A rectifier is irreversible and while electric braking might be used, regenerative braking is impossible. The direct current voltage is dependent upon the alternating current voltage, and while the a.-c. volt-

age could be varied within certain limits by transformer taps, a certain amount of control resistance would probably be necessary. This would mean a resistance power loss which would somewhat offset the high efficiency of the rectifier. A single-phase rectifier without suitable auxiliary apparatus would create a large amount of inductive interference with communication circuits. While such interference could probably be overcome, it would mean the development of special apparatus and some increase in the cost of the locomotive. Furthermore, the rectifier itself is in a state of development and while it is finding much favor for use in railway sub-stations, it probably is not ready for application to a locomotive. Except for the lack of regenerative braking a rectifier locomotive would perform the same service as the motor-generator locomotives now in service on the New York, New Haven & Hartford, the Detroit, Toledo & Ironton and the Great Northern. Both offer the untried possibilities of a 60-cycle trolley with direct current traction motor but the success of the motor-generator type locomotives now used on 25 cycles will probably determine how much consideration should be given to a rectifier locomotive.

By-Products of Apprentice Training

THE increasing interest on the part of a considerable number of railroads during recent years in the effort to raise the standard of apprentice training for the shop crafts, is indicative of the growing belief that such training is necessary and that it pays. A study of the effects of the introduction of new and better methods of apprentice training indicates that there are certain important by-products which have a real and substantial value. Improved apprenticeship methods attract a higher standard of boys—high school graduates are now in the majority on several roads. Boys with such preliminary training and with better organized apprentice school instruction and other forms of encouragement, take a more lively interest in their work and are inclined to ask pointed questions about the whys and wherefores of the tasks to which they are assigned. This sometimes leads to embarrassment on the part of the mechanics or the supervisors to whom such questions are directed. Then, too, apprentice clubs frequently call upon the supervisors or leading workers to speak at the meetings, and these speakers are quite likely to become the targets for all sorts of questions. The growing practice of having an apprentice board at each shop, presided over by the master mechanic or shop superintendent, and including in its membership department foremen, has been another factor in bringing the supervisors into closer and more intimate contact with the boys and their problems.

It is not to be wondered at, therefore, that many supervisors and mechanics have been encouraged and spurred on to renew their studies and to extend their reading of technical books and magazines. In at least one instance a strong supervisor's club has resulted from the activities of a lively apprentice club, which set a pace which stimulated the supervisors to organize a club of their own and which, incidentally, is now taking a keen interest in the progress and welfare of the younger group. In considering the cost of installing a modern, up-to-date apprenticeship system, therefore, it is important to keep in mind some of the possible by-products which, in themselves, may go a long way toward justifying the expense and effort.

The Defense of the Commission

THE most significant feature of the hearing in the O'Fallon railway valuation case in the federal court at Kansas City last week was the argument in support of the Interstate Commerce Commission's method of valuation made by the attorneys of the commission. Counsel for the railways showed clearly that in its recent decisions in the Southwestern Bell Telephone case, the Indianapolis Waterworks case and other cases the Supreme Court had held that in valuations of public utilities effective weight must be given to present day costs. The attorneys for the commission defended its "prudent investment" theory upon the ground that principles applied by the Court to public utility property are not applicable to railroad property. They went still farther and contended in effect that railroads are not property at all in the usual sense. They argued that a railroad is merely an instrument of the government performing a function of government, and is therefore not entitled to the constitutional protection which safeguards private property generally. They urged that the right test to be applied by a court in passing upon the valuation of a railroad is whether, with the return actually allowed to be earned upon this valuation, the railroad is prosperous measured especially by its ability to raise adequate capital. The present condition of the railroad stock market was used as proof of the present profitability of the railroad industry.

Significance of the Defense

The fact that the commission's method of valuation has to be defended with such arguments is striking proof of how far it has gone in accepting radical theories and trying to apply them in railway regulation. The argument in defense of the commission's theory is the very negation of the reasoning by which the courts have heretofore arrived at their conclusion that railway rates must be so regulated as to produce at least a fair return upon a fair valuation. The courts first held that the rates of railways were subject to public regulation. There was then soon raised the question as to how far such regulation could be carried. The reasoning of the courts in answering the question was simple and clear. Railways, they reasoned, are subject to regulation of their rates, but they are private property. Such property cannot be taken for public use without just compensation. Just compensation is payment of its present value for property, and to regulate railways so as to prevent them from earning a fair return upon the present value of their property would be indirectly to confiscate them.

Therefore, rates cannot constitutionally be so regulated as to prevent the railways from earning a fair return upon the present value of their property.

What did public policy require railways to be allowed to earn? The courts had nothing to say about that. They must be allowed to earn at least a fair return upon the present value of their properties. While an administrative body could not lawfully restrict them to less than this, it could decide whether it would be sound public policy to let them earn more.

This was the recognized law of the land when the railroad valuation law was passed and the work of making a valuation was begun. Now the commission says that what the railways should be allowed to earn is the amount required to enable them to raise adequate capital. Obviously, if this is the correct legal principle there is no need whatever, and never was, for a valuation as a basis for the regulation of rates. The Class I railways since 1920 have earned a net operating in-

come ranging from \$601,000,000 to \$1,213,000,000 and averaging \$940,000,000. The commission's attorneys contend, in effect, that the present condition of the railroad industry shows this has been sufficient. If mere observation of the physical and financial condition of the railroad industry at any given time or over any given period will show whether the net return earned by it is or has been sufficient both to avoid confiscation and to enable it to function satisfactorily, why did the commission begin saying years ago that a valuation was needed to enable it to determine what the railways ought to be allowed to earn? If the defense now made of its method of valuation is sound the more than \$120,000,000 that has been spent in making a valuation has been wasted.

Complete Change of Attitude

Those who are familiar with railroad history will at once see how completely the commission has changed its attitude toward valuation. Some years before the war the railways began to seek general advances in their rates. At times they used the argument that they were entitled to a fair return upon a fair valuation, but the argument most used by them was that the net returns they were then earning were inadequate because plainly insufficient at the time to attract enough capital into the railroad industry. It was this demand of the railways for higher rates that gave the movement for a valuation its effective impetus. Those who then opposed advances in rates argued for legislation providing for a valuation upon the ground that the railways were entitled only to a fair return, and that what this was could not be ascertained without a valuation. Nobody connected with the railroad industry denied then or denies now that the best test of whether the returns railways are allowed to earn are adequate is their ability over long periods to raise sufficient capital for improvements and expansion. But why do those who hold a brief against the railways now press this doctrine hard in the valuation litigation? For the obvious reason that it has been found that a valuation made in accordance with what always has been recognized as the law of the land would be higher than was expected when the valuation legislation was advocated and passed.

Now, we can understand why lawyers change the arguments they make before commissions and courts in accordance with changed conditions. What we do find it difficult to understand is how the Interstate Commerce Commission, which is supposed to be a quasi-judicial body, can so completely change its views and allow its attorneys to advance arguments by which it declined to be influenced when they were advanced by the railways in rate cases only a comparatively few years ago. The situation illustrates the most dangerous feature of regulation of railways in this country. This is, that the nation has no definite and consistent policy of regulation. It was understood to have adopted such a policy when the Transportation Act was passed. But the commission has not carried out the policy of that act and evidently has no intention of doing so. It was the plain purpose of the act to cause the railways to be allowed to earn at least a fair return upon a fair valuation as then understood, and as much more as might be required to assure the furnishing of adequate transportation. They have not been allowed to do so, are not being allowed to do so now, and, under the commission's policy of valuation and rate making, never would be allowed to do so.

Owing to extraordinary and almost unprecedented conditions in the money market the securities of many

railways are now selling at high prices in spite of the fact that the policy of the Transportation Act is not being carried out. Past experience indicates, however, that present financial conditions are abnormal and temporary, and that, in the long run, it will not be possible for the railways to raise adequate capital under such a policy of regulation as that which now prevails. The new capital invested in the railways annually dropped from more than \$1,000,000,000 in 1911 to less than \$300,000,000 in 1916. The policy of regulation then followed caused this decline in railroad investment and the subsequent five years' shortage of transportation, but the commission never has publicly admitted that regulation was responsible for these developments. If its present policy leads to similar results in future it will no doubt be equally silent about its responsibility for them, but the railways should spare no effort to make sure the public will correctly place the responsibility.

Operating Efficiency Makes New Records

THE increases that are constantly being made in the operating efficiency of the country's railways have never been better illustrated than by the statistics showing the results of operation in July, which have recently been published by the Interstate Commerce Commission. New operating records are hard to make when traffic is declining, but, although freight business in July was eight per cent less than in July, 1926, several new high records of operating efficiency were made.

The amount of coal consumed in road freight service was relatively the smallest in any month in history, amounting to only 118 lb. per 1,000 gross ton-miles. Comparable figures for July in the preceding five years are, 1922, 145 lb.; 1923, 143; 1924, 134; 1925, 126; 1926, 121. During the first seven months of 1927 coal consumption averaged only 132 lb. per 1,000 gross ton-miles, as compared with 139 in the corresponding months of 1926. The steady increase in the efficiency with which fuel is being used is due both to the use of improved locomotives and to better operating methods.

The average speed of freight trains reached 12.6 miles per hour in July, which also surpassed all previous records, the result being that more freight service was rendered by the average freight train in each hour than in any previous month. The number of tons of freight moved one mile per average train in each hour was 9,853, as compared with the previous high record of 9,840 ton-miles per hour, which was made in August, 1926. The annual seasonal increase in traffic is now occurring, and when the operating statistics of the late summer and fall months are available they will undoubtedly disclose numerous records of operating efficiency surpassing any that have heretofore been reported.

The railways continue to report declines in their net operating income. The decline in June was \$20,000,000, or about 18 per cent; in July, \$32,600,000, or 28 per cent; in August, \$15,000,000, or over 11 per cent, and in the first eight months of the year about \$70,000,000, or almost 9.5 per cent. The decline in gross earnings in the first eight months of the year was about \$84,000,000, which shows that the decline in net has been less than the decline in gross. The average wage being paid is higher than last year, and, therefore, only the continued increase in operating efficiency has prevented the decline in net return from being much larger.

Roller Bearings on Railway Cars*

*Starting, acceleration, running and power consumption
test results—Trucks with inboard bearings
for freight cars*

By Walter C. Sanders

General Manager, Railway Division, Timken Roller Bearing Company, Canton, Ohio

MANY attempts have been made during recent years to solve for railways the problem of roller bearings. Failures have ordinarily resulted from one or more of three causes: First, the crushing strains under heavy loads and blows upon the surfaces of the metals in rotating members and raceways resulted in fatigue and fractures; second, the diagonal twisting and jamming of rollers; and third, the troublesome end thrust which may at times equal 40 per cent of the vertical load.

For the heavy combined vertical and thrust loads at high speeds, the tapered roller bearing principle seems essential to durability. Not only should the bearing perform the dual duty of taking radial and thrust loads, but in a railway roller bearing there must be no delicate, breakable, or complicated parts involving expensive renewals.

Railway mechanical engineers have made valuable contributions to the development of a successful bearing by showing what the requirements of the service actually were and by pointing out the weak spots in bearing design which were to be avoided.

The Tapered Roller Bearing Principle

The principal object of the tapered construction is to provide capacity in the bearing for the thrust loads, which exist in all railroad applications, with no appreciable sacrifice in vertical load carrying power. Fig. 1 shows a Timken roller bearing with an included cup angle of a little less than 24 deg. Assuming a load of 100 units *AB* applied radially or vertically to the roll, the normal pressure *CB* on the roll is 102 units. The thrust capacity of this particular roll is represented by the line *AC* and is equal to 20 units. By reason of the fact that only the top rolls in the bearing carry vertical load, the bearing has a thrust capacity almost equal to its vertical capacity. In other words, with an increase of two per cent in the normal load on the rolls under vertical loading, a thrust capacity equal to the vertical capacity is obtained. By varying the included cup angle the ratio

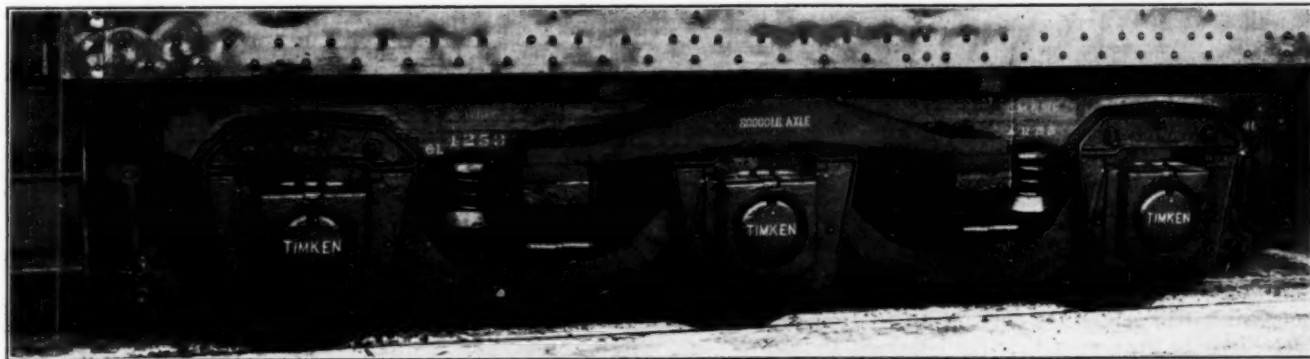
of thrust to vertical or radial capacity can be changed over wide limits.

Another advantage of the tapered construction has proved, however, to be quite as important as the provision for thrust loading. Operation of a roller bearing, particularly at the higher speeds, requires correct alignment of the rollers with respect to the axis of the bearing. If the rollers are not accurately aligned, contact with



Comparison of Standard A. R. A. and Inboard Type Trucks
—Outside Overhang Is Eliminated on Roller
Bearing Truck

the races over their entire lengths will not be obtained and dangerous concentration of stresses on small areas will result. In Fig. 1 the reaction of the roller against the rib on the inner races is represented by the line *DE*. The end of the roller makes contact with the rib on two areas *F* and *G*. This double contact holds the rolls in positive alignment entirely independent of the cage and assures an equal distribution of stress over the length of the roll. The alining principle has been checked by



Six-Wheel Passenger Car Truck Equipped with Roller Bearings

*Abstract of paper presented at the Seattle, Washington, meeting of the American Society of Mechanical Engineers, August 29 to 31, 1927.

Tapered roller bearings were brought to their present stage of development only after a long and painstaking series of tests, both laboratory and service, which extended over a period of several years. The first of these tests was conducted to obtain data on the comparative starting, acceleration, running and coasting of two standard railway freight cars, one equipped with tapered roller bearings and the other with plain bearings. The two cars were of the same series and identical in every respect with the exception of the bearings. The roller bearing car had made 22,100 miles in main line service, and the other was selected at random from among the cars usually used by the same railroad that was operating the roller bearing car. Both cars underwent the test in the same condition as they were received from the railroad.

plied to the block and tackle until the car started, at which instant the dynamometer reading was taken. A total of 56 readings in both directions were taken. An average of the readings shows the following results:

Roller bearing car.....	4.38 lb. per ton or 267 lb. total to start
Plain bearing car.....	38.59 lb. per ton or 2,337 lb. total to start
Ratio	8.8 to 1 in favor of roller bearing car

In the acceleration test each car in turn was hauled by a 300-hp. plain-bearing electric baggage car for a run of 20 seconds. Readings were taken as soon as the car started and every five seconds thereafter. The average of results shows the acceleration in miles per hour per second for 15 seconds to be .69 for the roller bearing car and .57 for the plain bearing car. Speed after 20 sec-

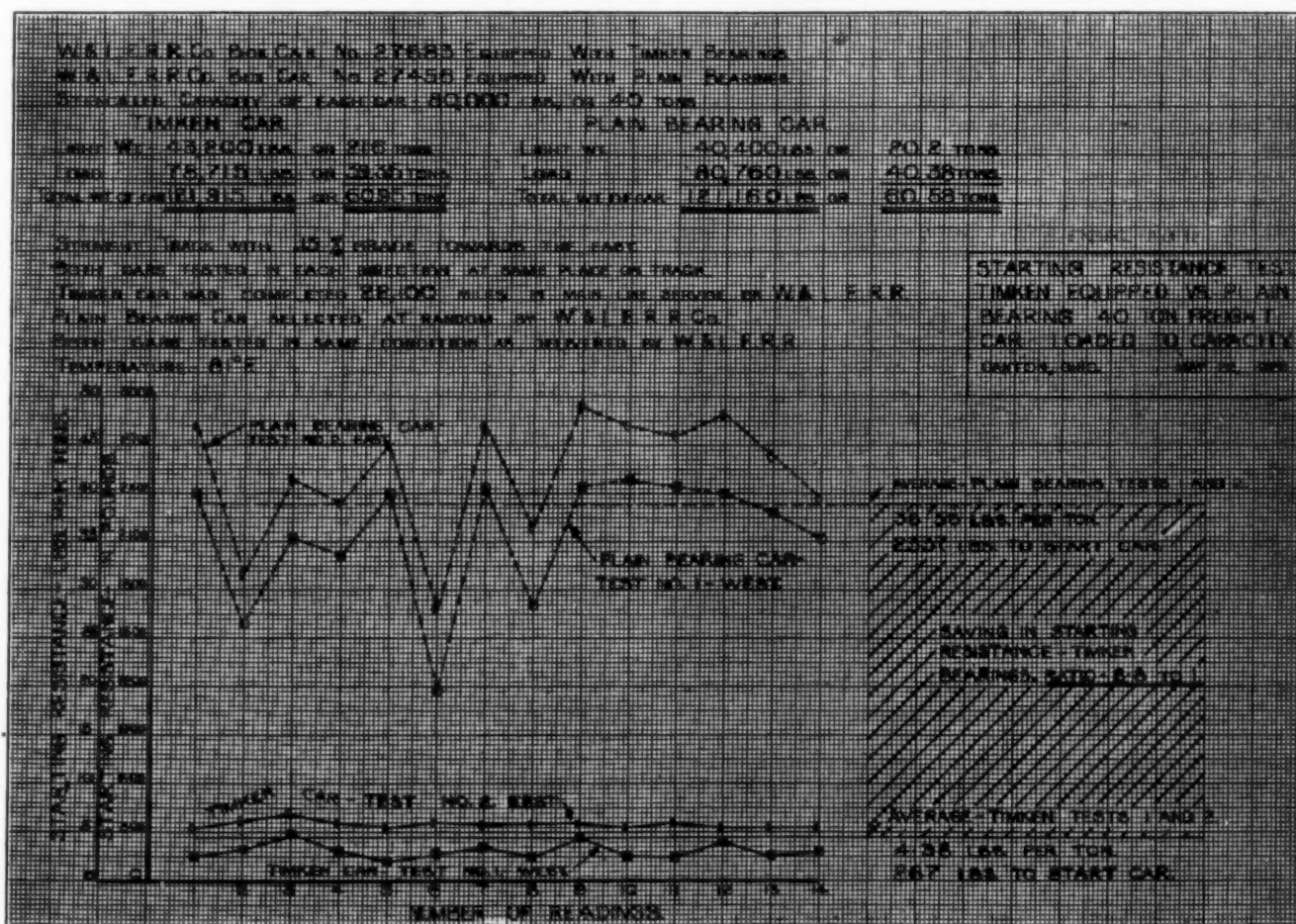


Fig. 3—Starting Resistance Test of Tapered Roller Bearing Against Plain Bearing Freight Car of 40-Tons Capacity

The cars were loaded to capacity with steel billets. The following table gives the weights, light and loaded, that existed throughout the tests:

	Roller bearing car, lb.	Plain bearing car, lb.
Stenciled capacity	80,000	80,000
Weight unloaded	43,200	40,401
Load (Steel billets)	78,715	80,760
Total weight (car and load)	121,915	121,160

Fig. 3 shows the results of the starting tests made with the two cars. The figure is self-explanatory but attention is invited to the fact that the ratio of the starting resistance of the two cars is 8.8 to 1 in favor of the roller bearing equipped car, or a saving in tractive force at starting of 88.8 per cent.

The starting test was conducted by attaching one end of a 3,000-lb. capacity dynamometer to the car and the other end to a block and tackle. Force was slowly ap-

plied to the block and tackle until the car started, at which instant the dynamometer reading was taken. A total of 56 readings in both directions were taken. The direct power saving during the run ranged from 28 per cent for the first five seconds to 18 per cent in 20 seconds.

The running test was made to determine the actual saving in power consumption of the roller bearing car. The test run was made over a stretch of track 28.30 miles long which included varied conditions of gradient and road bed. The cars were hauled by a 300-hp. plain-bearing electric baggage car and readings were taken every 15 sec.

The net results indicated a power saving of 17.4 per cent in favor of the roller bearing car.

The coasting test was conducted upon track which

was in poor condition. The down grade at the starting point was .25 per cent.

The roller bearing car started without assistance when the brakes were released while it was necessary to bump the plain bearing car three times with a locomotive before it would start. The roller bearing car coasted a distance of 7,200 ft. while the plain bearing car coasted 1,300 ft.

Another test which may be cited is of considerable interest, partly because of the results obtained in the matter of power consumption and partly because of the light thrown on the effect of journal friction on train resistance. These tests were conducted with two gas-electric trains in revenue service operating over a stretch of over 200 miles, one being equipped with roller bearings and other with plain. The two trains were made up of cars as nearly identical in weight as possible, the actual totals being 172,360 lb. for the roller bearing and 169,780 lb. for the plain bearing train. The track on which the tests were run shows an average up grade in one direction of .056 per cent for one section and .081 per cent for the other. The rail section was heavy and there was a high proportion of tangent track. Track maintenance and ballast were both good.

In the revenue service test, graphic records were made of traction motor voltage and car speed and the energy



Test Application of 70-Ton Inboard Type Trucks Under a Freight Locomotive Tender

input to the motors. On some grades the graphic meter records were checked by 10-second readings on indicating meters. As a further check, an accurate record was kept of the time of each power application and cut-off, of each brake application and of the duration of every stop.

A total of 26 tests were made and without going into detail, it was found that, without considering corrections for windage, or different track conditions, the overall power saving of the roller bearing train amounted to over nine per cent on a gross ton-mile basis.

In the case of starting, acceleration and coasting, the underlying reasons for the improvement can be explained as follows: Take starting for example, a plain bearing train on a level track will require a draw bar pull of several hundred pounds to overcome the resistance on each journal, the brasses of the bearings acting as so many brake shoes until the oil film is produced. With roller bearing journals, this high resistance is eliminated, and the axle is free to turn when a very small amount of power is applied because the action is rolling and does not depend to such a great extent on the presence of an oil film. The sliding friction is replaced by rolling motion, which accounts for the difference in starting characteristics.

The same principles hold true in the case of accelera-

tion and coasting. In the former case, the plain bearing will exert a braking action until the oil film is re-established, which takes at least sufficient time to make a noticeable difference in the accelerating period.

Hot Boxes

The frequency of hot boxes or the number per 1,000 car-miles will vary considerably on different roads, owing to the different conditions of operation. The cost to the road per hot box will also vary somewhat. One road has estimated that in passenger service a hot box costs approximately \$30 which would indicate that a road operating several thousand passenger cars must have a large hot box expense. The use of roller bearings will almost completely eliminate the troublesome hot box situation with all its attendant ills effecting thereby a considerable saving to the road.

Lubrication

Grease of about the consistency of vaseline is being used as the lubricant for tapered roller bearings under railway cars. When oil is used it is necessary to have an unfailing supply of a correct quantity. When a large quantity of oil is fed to the bearings, excessive heat is generated by the churning action. The resulting high temperatures thin out the oil, making it difficult to retain it in the housing, even with the best type of enclosure.

Experience has shown that grease made according to proper specifications will give very satisfactory results. Grease is more easily retained in the bearing housing than oil and produces lower bearing temperatures. It will stick to all parts of the bearing and protect them no matter how long a car stands idle, while gravity will drain the oil to the bottom of the box and leave the top of the bearing unprotected.

Grease also has the beneficial effect of gumming up at the outside of the enclosure which assists materially in retaining itself in the housing and in keeping out dirt, water and other foreign matter.

Among the requirements of a good roller bearing grease are the following: It shall be of the proper consistency and composed of a high grade soap and a highly refined, well filtered mineral oil. It must be free from corrosive matter such as grit, rosin, waxes, talc, mica, graphite, clay or fillers of any kind.

As to the cost of the lubricant itself although the initial cost per car may be greater in the case of grease than that of oil, greater final savings are effected because of the smaller amount of grease necessary per car-mile of actual service. Experience has already indicated that the initial supply of lubricant in roller bearing cars lasts much longer than it does with plain bearings and costs less for renewal, partly because there is less wastage of lubricant and partly because the amount needed is usually smaller. No difficulties have been experienced with grease during low temperatures.

With roller bearings on cars, several items of lubrication expense are eliminated at the outset and others are greatly reduced. Among those eliminated are waste and the labor charge for packing it in the bearings. In addition there is no necessity for maintaining a waste reclaiming plant, so that this expense is eliminated in cases where it exists.

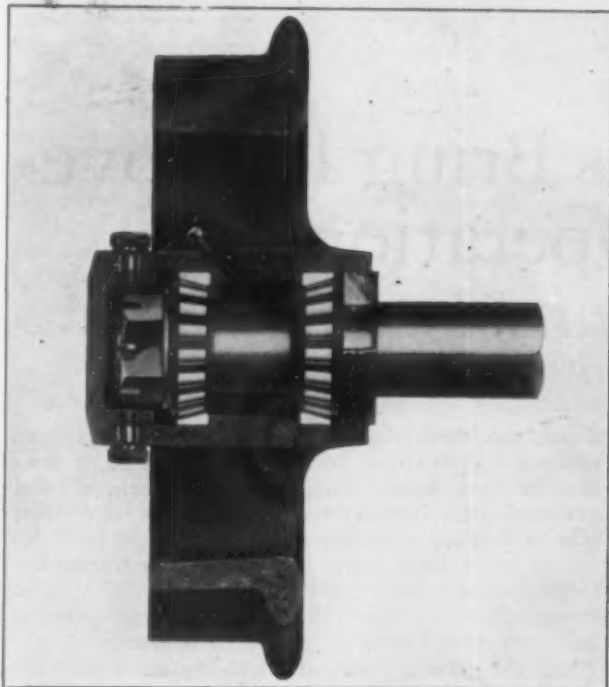
A check-up on the grease used in the bearings on the "Pioneer Limited" of the Chicago, Milwaukee & St. Paul, running between Chicago and St. Paul, Minn., for the month of July, 1927, disclosed that the cost of lubricant is much less for roller bearings than for plain bearings. The previous cost to lubricate the train on

plain bearings averaged 22.5 to 26 cents per 1,000 car-miles. The cost of grease for the roller bearings on this train for July, 1927, averaged 15.8 cents per 1,000 car-miles.

Brakes

The effect of roller bearings on braking conditions is another question to be considered. This may be briefly disposed of by stating they have in a general sense no appreciable effect. The braking effect depends only on the friction between the brake shoe and the wheel and the adhesion between the wheel and the rail. The latter should always be more than the former.

There is this difference which should be considered,



Application of Tapered Roller Bearings to the Hub of a Flanged Wheel

however, namely, that if power has been shut off and the train allowed to coast, it will have a greater speed at a given point and roller bearing cars will require more braking effort to stop when the limits are not predetermined. The engineman will have to apply his brake a short time sooner in order to stop at any desired point due to the difference between the journal resistance of the two types of bearings.

Roller Bearings for Freight Equipment

The Timken company has in successful operation a number of 50-ton and 70-ton freight cars embodying an entirely new type of inboard trucks. It is believed that this type of truck can ultimately be built by the car builders and railroads, including the roller bearings, at a cost not greatly exceeding that of the existing type of freight truck. An inboard truck, is one having the bearings mounted in a housing on the axle inside the wheels, there being no journal boxes and bearings outside the wheels. The freight cars equipped with this type of inboard trucks weigh appreciably less than the plain bearing freight cars, thus effecting a power saving because of their lighter weight as well as through the use of roller bearings. Fig. 4 shows the inboard truck as applied to

freight cars which are under test in regular revenue service.

The features of the design of the inboard truck are, first, a marked saving in weight due to the reduction in length and diameter of the axle and a reduction in length and cross section of the bolster and spring plank and second, simplicity of design. The inboard type truck is still in the experimental and development stage, although the tests have progressed far enough that the results obtained have indicated that this type of design is very feasible.

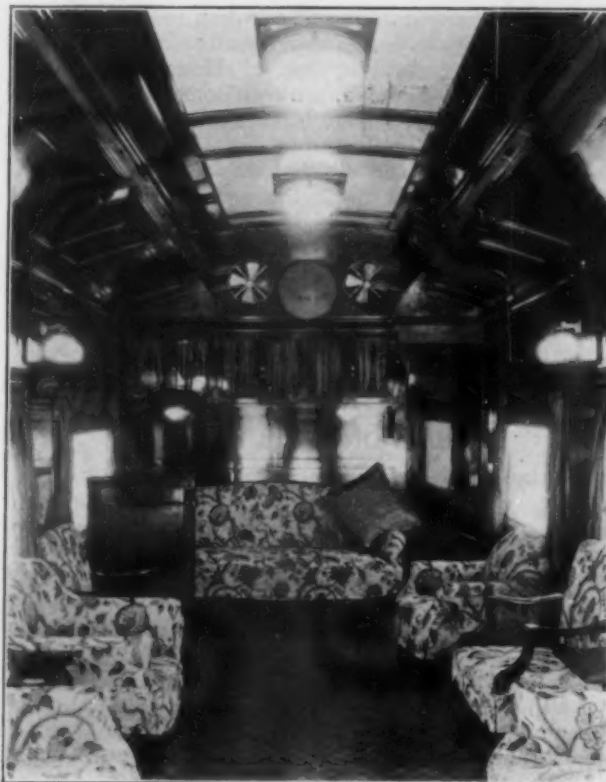
The adoption of roller bearings for freight train cars, regardless of the design of truck, faces the difficult problem of interchange. However, so great are the potential savings, that there can be no question about finding a way to solve the interchange problem and put these savings into effect.

Application of Tapered Roller Bearings

Inside the Hubs of Car Wheels

Because of their capacity for taking thrust loads, tapered roller bearings have been very successful in the wheel hubs of mine and industrial cars; and studies are now being made of their application to the hubs of railway car wheels.

A gasoline coach with tapered bearings in the hubs of the wheels of one truck is now in operation. The light weight of the car is 42,960 lb. and it has a seating capacity of 52 passengers. The principal advantage of the wheel mounting is that each wheel on the axle rotates independently of the other and no wheel slippage is necessary on curved track. This reduces the flange wear to a considerable extent. The adjustment is made on the cone by a nut on the end of the axle. The tapered design of the bearing takes the end thrust as well as the vertical load.



An Interior in the Prince of Wales' Train on the C. P. R.



Four Hundred Employees Attend Meeting

Efficiency Meetings Bring Improvements in Operation

Shippers attend meeting at which N. & W. employees discuss means of perfecting service

THE Norfolk & Western has attained first place among the railroads of the United States in the number of gross ton miles per train hour and has secured a 32 per cent improvement in fuel economy during the past five years as a result of the system efficiency meetings which this road holds each year at different points along its lines, according to J. E. Crawford, general manager, in an address before this year's meeting which was held at the Neil House, Columbus, Ohio, on October 4 and 5, with an attendance of 400 employees and 300 shippers. As another example of progress, he cited the fact that five years ago about 20 per cent of the locomotive's time was taken up in major repairs, while last year the repair time had been reduced to 9.2 per cent. Two years ago firebox overhauling and general repairs on a class Z locomotive required 19 days, while last year the forces at Roanoke, Va., overhauled a firebox and made complete repairs on this type of locomotive in 6 days. Furthermore the ratio to total claim payments to gross earnings has been reduced from 1.46 per cent in 1915 to 0.27 per cent in 1926.

Meetings Originated in 1912

The origin of these meetings dates back to 1912 when quarterly conferences were held on each of the five divisions of the road to discuss methods for improving service. Each meeting had a permanent secretary who was a member of the claim department, usually a route agent. Later these meetings were supplemented with semi-annual system gatherings, which continued until the war interrupted. In 1919, the annual system meeting was instituted with the general claim agent as chairman and the quarterly division meetings were developed into monthly meetings at the 30 larger points on the system. The attendance at these points varies from 40 to 1,000 employees, depending on the location.

The delegates to the annual meeting include all classes of employees and officers who are chosen by the superin-

tendents, the claim department and the organizations meeting at the 30 larger points. To be elected, a delegate must be a leader among his fellowmen, a good representative for his particular branch of service, must be able to produce constructive ideas and must have the ability to carry back home and spread the inspiration and information gained at the conference.

Several days previous to the annual meeting, a docket of subjects dealing with all phases of operation is prepared by the general chairman in co-operation with the officers of other departments and these are assigned to committees. The chairmen of the latter are picked by the same procedure, an effort being made not to select ranking officers. This practice, it is believed, inspires a more open discussion of subjects than would occur with an executive in charge. The nucleus of the membership of the committee consists of men and officers who are directly connected with a certain phase of operation. The remainder of the group, which totals around 60, are men and officers whose work is closely related to the subject of the committee and who are chosen by the general chairman with the aid of other departments, with the thought that they will profit by becoming familiar with the work of an associated department.

The purpose of the meeting is to encourage recommendations for improvements in service and operations and to bring the officers and men of all departments into intimate contact and thereby create a better understanding and establish a family spirit. This is accomplished by changing the delegates as much as possible from year to year in order to reach the greatest number of employees over a period of years and by the use of a special train in which the men live together during the two days of the meeting.

Committees Meet Separately

The meeting is opened by a general session which occupies the first morning and which is devoted to a special program of addresses. At Columbus, these were

made by J. T. Thomas, mayor of the city; J. T. Daniels, general secretary of the Columbus Chamber of Commerce; J. E. Crawford, general manager of the railway; Karl M. Burr, president of the Columbus Chamber of Commerce; B. W. Herman, vice-president in charge of traffic; P. C. Hodge, traffic manager of the Marble Cliff Quarries Company; Mathew G. O'Shaughnessey, traffic manager of the Ford Motor Company; W. E. Weakley, traffic manager of the Wm. Ritter Lumber Company; G. F. Butler, freight traffic manager of the railway; Edward Dayhill, chief engineer of the Freight Container Bureau of the American Railway Association; and Joe Marshall, special representative of the Freight Claim division of the American Railway Association.

In the afternoon the seven committees meet separately, discuss their subjects and prepare their reports. These reports are printed during the night so that each man present may have copies for discussion at a general assembly the following day.

300 Shippers Attend Banquet

The fact that 300 shippers were in attendance at the banquet which culminated the first day's activities indicates that the meetings also serve the purpose of establishing a better understanding between the shippers and the carrier. To bring the former into contact with as many branches of the service as possible, special seating arrangements were provided. An officer and three railroad men were assigned to a table with four guests with a view to enlightening the shippers on several subjects. As an example, one table included the chief engineer, a conductor, a rate clerk and a ticket agent; another a superintendent, a conductor, a special agent and a car inspector; another the manager of the fuel department, a general foreman, a brakeman and a rate clerk; and another the superintendent of telegraph, a fireman, a car inspector and the chief clerk to the general freight agent.

Addresses at the banquet were made by Wm. Klinger, chairman of the Ohio Public Utilities Commission, and H. C. Weller, general superintendent of the railway.

Clean-Up of Right-of-Way Recommended

The Way and Structures committee recommended that a general clean-up be made of station grounds, the right-of-way, yards and buildings. Surplus or emergency materials lying around should be properly piled and obsolete or scrap materials should be gathered up and properly disposed of. At points where abutting property owners dump tin cans or other refuse over the fence and down the slope of the right-of-way in the vision of passengers, the matter should be investigated and the practice stopped. It was also recommended that consideration be given to the disposal of scrap and excess fit material released from service at the time the general renewals are made, thereby relieving the accounts of large quantities of fit scrap material now being carried an excess length of time in the roadway and bridge material accounts. It was also felt that steps should be taken to concentrate all fit materials at central points on each division in order that a careful check might be kept of the supply on hand and the excess quantity transferred where needed or disposed of either by sale or as scrap. It was thought that a more careful inspection and classification might result in a substantial reduction in the amount of practically useless material being carried on hand for long periods of time.

The Mechanical committee urged that special attention be given the selection of cars and that cars that have been previously loaded with a commodity that

leaves an odor or stain be re-used for shipments of the same character when their selection can be done without delay. This practice will reduce the cost of reconditioning cars, which sometimes includes the removal of good flooring or lining. The committee also recommended that each local efficiency club appoint a standing committee to study local conditions and make recommendations governing the inspection and selection of equipment for the loading of freight in its territory.

The Norfolk & Western Family committee recommended that a careful survey of magazine distribution be made at all points with the view of insuring a more even and equitable circulation among the employees, and that all members of the road be urged to write articles of general interest for the magazine. It also asked that the articles in the publication include additional recipes for the home department, a helpful or inspirational message from one of the executive officers in each issue, good fiction and facts and figures regarding the conservation of fuel, both in stationary engines and locomotives.

The Traffic committee urged that each employee do his utmost to further improve courtesies to shippers and passengers and that promptness be applied to the movement, the notification of arrival and the delivery of freight. In the securing of new patronage, it emphasized honesty.

Longer Trains Recommended

The Transportation committee suggested that as a final solution of the question of right handling that a comprehensive effort be made to organize the entire railroad personnel into a more compact unit and inculcate ideas that are designed to develop a spirit that will not be content to drift along unprogressive lines. It also recommended that intensive supervision be applied to the proper training of engine service employees to reduce fuel consumption, feeling that the personal element is the predominating feature in its conservation and that the matter of being able to curtail at greater length the extravagant use of fuel is dependent in no small degree upon the methods and practices that are taught the custodians of the fuel supply.

It also asked that the problems of selecting the proper time for starting freight trains be worked out with the utmost precision and an on-time dispatch of them be arranged for with the tonnage of the trains so grouped as to permit the longest possible movement being made and that intermediate switching be minimized. It further recommended that a careful study be made of slow orders, interference incident to track maintenance, watering and train inspection points, etc., to determine whether or not any such details of operation may be improved upon insofar as the fuel economy idea is affected.

The Committee on Freight Station Operation recommended that a more general use of stencils for the marking of freight be encouraged and that shippers be urged to use a typewriter in the preparation of shipping orders. Shipments of furniture, such as buffets, china closets, dressers, etc., with glass should not be completely covered with paper, but some portion of the glass should be exposed so that all handling the shipment may have the opportunity to know exactly what is in the crate. More attention should be given to the marks and labels on packages.

The committee further suggested that the freight stations be placed at a point easy of access and egress and where the movement of teams and trucks will not be hampered by the continuous movement of through train service, which causes delays and the possibility

of serious accidents. Team tracks and team track yards should be paved to attract public attention and should be equipped with a derrick or a crane for the handling of heavy pieces of merchandise. Desks, mechanical devices, telephones, etc., in the freight stations at larger points should be arranged to eliminate lost motion. A billing machine which dispenses with the necessity of loading the forms should be used. A study made on an old type of machine which required the carbons to be placed in the form by hand before the letters were placed in the machine, showed that one hour was used to load and unload 100 strips, consisting of three waybills each. To save the time lost by the messenger service in the exchange of waybills and freight bills between the receiving and delivery clerks and the freight office, the installation of air tubes or some other mechanical device was suggested.

The Committee on material and supplies offered the following suggestions to effect the greatest efficiency and economies: That estimates for new installations, construction and betterments be made with the utmost care and discretion as to quantities of each item needed, that a schedule of delivery be outlined as to prosecute the work progressively to completion; that prompt notice be furnished the supply officer when any authorized project is about to be held in abeyance; that coordinating measures be set up between the stores department and the users of material with a view to adapting standard stock items instead of those of special design; that employees authorized to draw out and use materials and supplies assure themselves in every instance as to the actual need for any item and the quantities requested; that only quantities of any item adequate to supply a thirty-day period based on the record of past consumption be ordered on requisition, that all unapplied material be brought under the supervision of the storekeeper for storing, handling and disbursing, that frequent inspections of lockers, desk drawers, shops and buildings be instituted and that all surplus excess stock and scrap articles be promptly returned to the general storekeeper.

Court Refuses Review of O'Fallon Valuation

THE St. Louis & O'Fallon and the Manufacturers Railway were denied the right of a complete court review of the federal valuation of their properties, through the introduction of new testimony, in a decision reached on October 6 by the federal court at Kansas City, Mo., in a hearing on the test valuation case of these railroads against the Interstate Commerce Commission. The application for a permanent injunction to restrain the Commission from enforcing its order of March 31 directing the payment to the government of excess earnings under the recapture clause of the Transportation Act of 1920 was taken under advisement by the court after hearing the arguments of both sides on October 5, 6 and 7. It is expected that the court's decision will be rendered before December 10, the effective date to which attorneys for the commission indicated that the recapture order would be extended.

The right of intervention in the case was denied by the court to the National Association of Railway Commissioners, the National Conference on Valuation of Railroads, the Illinois Commerce Commission and the City of Chicago. The three judges sitting in this court at the time of the hearing were Kimbrough Stone and

Arba S. Van Valkenburgh of the United States circuit court of appeals, and Charles B. Faris of the federal district court of St. Louis, Mo.

The case for the carriers was argued by Frederick H. Wood of New York, Daniel N. Kirby, counsel for the O'Fallon, Leslie Craven, counsel for the Presidents Conference Committee on Federal Valuation of Railroads, and Robert H. Kelley. For the United States the case was presented by Blackburn Esterline, assistant to the solicitor general at Washington, while the Commission was represented by Walker L. Fisher, employed as special counsel, O. E. Sweet and Roland J. Lehman.

The Valuation Basis

A favorable decision on the carriers' request to introduce new testimony would have compelled the court to undertake a complete review of the actual valuation of the railroads involved in order to determine whether the order of the Commission amounts to confiscation. Counsel charged that the recapture order is invalid inasmuch as the commission has based its valuation on the "original cost" or "prudent investment" theory and contended that present day construction costs should be considered for recapture valuation. Several recent decisions of the United States Supreme Court were mentioned to show that the value of a railroad or public utility property must be based upon a consideration of present day costs. Evidence was also introduced to show that federal courts have upset the valuation decisions of 15 state railroad and public utility commissions in which the present construction costs had been ignored.

Counsel for the Commission contended that the valuation of the O'Fallon had taken into account all of the relevant facts and was not actually an adoption of the "prudent investment" theory since some attention had been paid to present construction costs. They also advanced the theory that "value" as used in the decisions of the supreme court does not mean economic value, but "what is fair." The court then should find whether the valuation amounted to confiscation, it was urged, by examining the ability of the railroad industry to attract capital and its prosperity. The condition of the railroad stock market was cited as proof of the profitability of the business. It was also argued by the Commission that a railroad is a mere instrument of government and as such its property is not entitled to the constitutional protection which safeguards private property generally.

"Obvious Intention" of Congress

The "obvious intention" of Congress, as expressed in Section 15a of the Transportation Act, to subject to recapture only those earnings which should arise under the terms of the Act, constituted another issue set up by the railroads. Rates sufficient to pay a return of 5¾ per cent upon the value of the property in the respective regions have not actually been established by the Commission, counsel declared. They used the facts concerning the present level of rates in the Eastern district, in which the O'Fallon is located, as a basis for an attack upon the recapture of the earnings of the O'Fallon, contending that earnings should not be recaptured excepting when the roads of an entire group have earned the average return contemplated by section 15A.

NEW YORK UNIVERSITY announces that a course in the prevention of accidents is now a permanent feature of its curriculum, and that the instructors will include a distinguished list of men who have had practical experience in accident prevention work. The director is C. W. Price.

High Pressure Steam Driven Car Is Developed

International Harvester power plant is also adaptable to switch engine drive

A HIGH pressure steam power plant for transportation purposes, including rail car and switch engine drive, has been in the process of development in the laboratories of the International Harvester Company, Chicago, for several years. The first application of this power plant has been in the 73-ft. passenger-baggage car illustrated. The power plant is a distillate burning, direct mechanical drive unit designed to be noiseless, smokeless and easy riding, with ample power for hauling additional trailer tonnage. This unit, which is known as the "Locomotor," has been thoroughly tested in recent months and plans are under way to place

side the car and two eight-cylinder uniflow engines, supported under the body of the car and arranged to drive through suitable propeller shafts and gears to the inside axle of each truck.

The Steam Exhausts into Condensers

The exhaust steam from these engines is conveyed to condensers on the roof at each end of the car where the steam is condensed, the condensate then being passed through an oil separator and returned to what is known as the hot well. A feed-water pump takes water from the hot well at a temperature of about 130 deg. F. and



Rail Car Equipped with International Harvester High Pressure Steam Power Plant

it in regular service in the Chicago territory in the near future.

The car has a 17-ft. baggage compartment in one end which also contains the steam generator and auxiliary power equipment. The present seating arrangement provides for 63 passengers. But one operator is required as far as running the car and the power plant is concerned; duplicate controls, provided on the platforms for operation in either direction, consist merely of the familiar throttle, reverse lever and air brake valve handle.

The self-regulating power plant is designed to develop 300 hp. at the wheels and requires no attention after the working steam pressure is once attained, which takes 15 to 18 minutes from a cold system, or three minutes after the main burner has been lighted. Steam is developed at 600 lb. pressure and 200 deg. of superheat in a steam generator 4 ft. in diameter, located in one corner of the baggage compartment. This steam is used to operate one auxiliary engine generator set in-

jects it into the steam generator from which it again passes out as superheated steam to the engine. The system is thus closed the only water required being about 4 gal. of make-up water a day. This re-use of the condensate, together with extremely rapid forced circulation, it is stated, prevents the deposit of scale in any part of the circulating system. Condensation of the exhaust steam eliminates this common source of noise and the provision of preheated air and a carefully regulated blower assure practically complete combustion and the absence of smoke. Adequate provision for heating, when necessary, is made by diverting part of the exhaust from the auxiliary engine through suitable heater pipes.

The fuel used may be any ordinary grade of distillate readily procurable in the open market. Tests of the car illustrated are said to show a fuel consumption of one gallon of distillate, at a cost of about 5½ cents, for 1½ miles, or over 100 ton-miles of operation. The completeness of the combustion secured is indicated by

the absence of accumulated carbon deposit in the generator after two years' service. Analysis of the flue gases is said to show carbon dioxide with a slight excess of oxygen and complete absence of carbon monoxide.

The flame of the burner is controlled by the steam pressure in the generator within narrow limits. When the pressure reaches 600 lb., the flame is extinguished, being re-ignited when the pressure reduces to 550 lb. Steam pressure gages are located in the baggage room and on each platform. The water level is shown by a special indicator in the baggage room and two lights on each platform. The system is designed to operate between ordinary terminals without requiring additional water but should water depletion be indicated by the lights, the operator may turn a small water control valve and add sufficient water to the system to restore the level.

The automatic pressure regulation, and a balanced



View Showing Front End Details Including Condenser Fans

steam storage provided in the system, are designed to assure a constant supply of steam at operating pressure. The water carried in the power plant for steam generating purposes is only the approximate quantity which would be required for cooling an internal combustion engine of equivalent power. As only three of four gallons of new water are used per day in ordinary operation, the auxiliary supply may be fixed to suit any condition. The small water consumption and the distilling action of the generator are said to render unnecessary the provision of distilled, treated or carefully selected water.

The fuel tanks carry sufficient distillate for 350 to 400 miles of operation and this capacity may be increased, as there is no explosion risk involved in carrying quantities of this kind of fuel.

The steam generator is composed of an electric-driven blower, drawing hot air from the space in the closet surrounding the generator; a gasifier for heating

the gas and the burner consisting of metal rings through which the hot gases pass and are consumed in a transparent blue flame in the combustion chamber; a circulating system composed of tube coils, totaling 325 sq. ft. of heating surface, 256 sq. ft. of which is in the preheater tubes and 69 sq. ft. in evaporator and superheater tubes; a storage and separator drum; a water level indicator, and the usual connections to the steam gage, pressure regulator, safety valve, blow-off valve and try-cock used to assist in filling the cold system initially. The entire design has been worked out to bring the cooler gases in contact with the tubes containing the cooler water, and the hottest flame and gases in contact with the tubes containing the hottest water and steam. The progress of gas temperature from high to low, as the outside of the cylindrical steam generator is approached, together with the use of the surrounding heated air to supply the blower, makes for an efficient unit and avoids the necessity of providing an insulated jacket enclosing the generator.

The condensers, located on the roof at each end of the car, are composed of several cores connected in series of pairs, all cores being positioned so as to be self-draining with no valves or cut-out cocks. At the head end, the air enters horizontally through the tunnel beneath the condensers and passes upward through the cores. At the rear end, it is sucked downward through the cores and leaves through a similar tunnel. In cold weather, the air pressure from the movement of the unit accomplishes condensation. For warmer atmospheric temperatures, three specially designed reversible fans are provided at each end to increase the air circulation as required.

The high steam pressure used in this car makes possible a powerful but compact engine design. The two eight cylinder uniflow engines are of the single-acting poppet valve type, located underneath the car where they are easy of access and may be quickly removed and replaced. The single-acting feature permits the use of flange piston rod guides, eliminating difficulties with piston rod packing.

Steam from the admission manifold is conducted to the cylinders through poppet valves, the stems of which are positioned on a camshaft shifted longitudinally in response to movement of the reverse lever. When the pawl is positioned in the central notch, the valve stems rest on round sections of the camshaft and the admission valves are firmly seated. This is the position used when drifting without any valve movement. When the notched shaft is one notch ahead, it places beneath each valve stem a cam which raises the admission valves for 15 per cent of the piston stroke. Similarly, cut-offs of 25 per cent and 75 per cent are available in each direction, thus affording a high tractive force for starting and an efficient high speed cut-off.

An oil pump, located inside the crank case, forces oil to the crossheads and the main and connecting rod bearings of the crankshaft, all parts, including the cylinders, being lubricated by force feed. The recovery of practically all the oil carried away as vapor in the exhaust confines oil consumption to the small quantity used directly for lubrication of moving parts. The oil separator, of the DeLaval centrifugal type, consumes about $\frac{3}{4}$ hp. at operating speed, and is estimated to reclaim 98 per cent of the oil in the condensate.

The driving shafts are especially designed of alloy steel, heat treated. To accommodate variations in truck positions, the shafts fit into splined sleeves and have a universal joint at each end. The connection between the drive shaft and axle is accomplished by means of bevel gears with constantly changing tooth contact, enclosed in a cast steel, oil tight gear case.

The trucks are of the 4 wheel equalized type, with Commonwealth cast steel frames and swing bolsters, and 36-in. rolled steel wheels with Simplex clasp brakes. Plain journal bearings are provided on the car illustrated.

Braking power is furnished by a General Electric electric-driven air compressor and Westinghouse equipment, including a 16-in. brake cylinder and type "L" triple valve.

It is claimed that, in addition to affording a clean, silent and reliable transportation power operating efficiently with a low priced liquid fuel, the Locomotor power plant is of substantial design conducive to long life and freedom from breakdown. Maintenance cost is expected to be kept at a minimum by the closed system of lubrication, the simplicity of construction and consequent low cost of repair parts.

It is understood that this type of power plant is next to be introduced in a switching engine for service requiring up to 1,500 hp. in districts where it is desirable to eliminate noise and smoke and still avoid the installation of expensive electric transmission lines.

The manufacture and sale of the Locomotor will be handled by the Railway Locomotor Company, Chicago, a subsidiary of The Ryan Car Company.

Denial of Application for Competitive Line Urged

WASHINGTON, D. C.

EXAMINER H. C. Davis of the Interstate Commerce Commission, in a proposed report on the application of the Piedmont & Northern for a certificate authorizing the construction of two extensions, from Spartanburg, S. C., to Gastonia, N. C., 53 miles, and from Charlotte to Winston-Salem, N. C., 75 miles, has recommended to the commission a finding that the construction proposed would result in an unwarranted duplication of existing railways; would impair their facilities by diverting their traffic; would not open any through routes that are not now available; would perform no transportation service of importance that cannot be performed by existing lines; and is not required by the present or public convenience and necessity.

He also recommends a finding that the railroad as proposed to be extended would be a "commercial railroad operated by electricity, and not an electric interurban railway within the exemption contained in paragraph 22 of section 1 of the interstate commerce act"; that the construction proposed is not part of a project begun in good faith prior to the effective date of paragraph 18 of section 1 and thereafter prosecuted with reasonable diligence, as contended by the applicant, that the commission has jurisdiction of the applicant and that it should be denied.

The company had asked for a certificate if deemed to be necessary but had taken the position that no authority from the commission was necessary. Mark W. Potter, formerly a member of the commission, was of counsel for the applicant, and W. G. McAdoo, formerly director general of railroads, was of counsel for the Georgia & Florida, which intervened in support of the application. The Southern, the Atlantic Coast Line, the Seaboard Air line, the Carolina, Clinchfield & Ohio, the Louisville & Nashville and the Charleston & Western Carolina, appeared in opposition.

The commission has held in the past that a certificate is not required where construction was begun prior to the effective date of the new law and was thereafter diligently prosecuted to completion, but the examiner

says the facts do not bring the present case within the principle announced. Much of the report is devoted to the question of the jurisdiction over an electric line, but more is devoted to the effect on traffic of other lines. Excepting as to the proper handling of local less-than-carload freight, the report says, any advantages shown for the applicant's freight service are of minor importance. It is stated that the passenger service of the proposed lines would be of some benefit to the region served but little need for it exists.

The ability of the applicant to finance the work was not questioned. While the applicant contended that the so-called Duke interests would not exercise control of the applicant, the report says, "it appears reasonable to conclude that effective control will be exercised with a unity of interest." Referring to the contention of protestants that the composition of applicant's board of directors indicates that it has been chosen, not for its fitness to direct the affairs of a railroad but to control traffic in its favor, the report says that at least 20 of the 25 are prominently connected with the ownership and management of cotton mills in the general territory in question, and that "the evidence shows no similar directorate in the case of the steam railways." In conclusion Examiner Davis says in part:

The proposed lines would closely parallel existing railways throughout their entire length. They would touch no local point of importance not served by existing lines, and the territory to which they would bring rail transportation closer is very small and of limited possibilities in agriculture.

The territory to be traversed has excellent highways. There is bus and truck service on highways that closely parallel the proposed route. The railways have good and prompt service to all points that could be reached by the proposed lines and their connections.

Some defects are shown in the less-than-carload service of the Southern in this territory, but they are not inherent in the physical property and should be removed, or at least diminished, by administrative measures which are being taken.

The existing lines have a present developed capacity in excess of present traffic requirements, and a much greater potential capacity. The through routes proposed in connection with the applicant's extended line are generally longer than existing routes, so far as the record permits comparison, and are not shown to have substantial advantage in other respects, or any economy in the cost of transportation.

They would no doubt tend to strengthen the G. & F., which carrier, however, has obtained permission to extend its line without mentioning these proposed extensions as necessary to its success.

They would also tend to diminish the usefulness of the connection which is to be built between the L. & N. and the Clinchfield, and to postpone carrying out the ultimate plan for that connection, which would effect a further reduction of 52 miles in the L. & N.-Clinchfield route. This enterprise has more value to the system of through transportation than anything that could be accomplished by the proposed extensions.

The proposed lines would earn a revenue sufficient to justify their construction, if it were not to be diverted from existing lines, particularly from the Southern, which they would closely parallel. They would owe this revenue in part to the power of the applicant to control traffic of companies owned by the same interests, and in some degree to the power of those interests to influence the routing of traffic other than their own.

There would no doubt be some benefit to the region immediately served, notwithstanding some impairment that would be likely to result, temporarily at least, in the service of existing lines.

These benefits would be largely of a competitive nature, that is at the expense of other localities, and could probably be urged in favor of duplicating most of the railway lines in the United States.

Competition reasonably necessary should be provided without extensive duplication. The construction of the applicant's railroad and of its proposed and projected extensions present a rather extraordinary case of paralleling an existing line.

The presumption against such paralleling as is now proposed can not be overcome by such evidence as is here presented. The investment proposed would not be justified by the net addition to the railway revenues of the country. The competitive nature of the enterprise is aggravated by the association of the applicant with large interests which have the power to control or influence much traffic on other grounds than transportation service.

New Brownsville Station Is of Attractive Design

A SMALL passenger station has been built for the Missouri Pacific Lines at Brownsville, Texas, which comprises an unusually attractive example of the adaptation of Spanish architecture to railroad purposes. The building is of moderate size, but affords ample accommodations under the climatic conditions which are such that there is not so much need for large interior capacity, ample space being pro-

vided for passengers under canopies and umbrella sheds are effectively concealed by a wall with a tile coping that is pierced by three arch openings and a small doorway provided with a double swinging iron gate of ornate design. The commercial significance of the building is further suppressed by limiting all reference to its use to a single sign bearing the name "Missouri Pacific Lines" in a simple type of raised metallic lettering.

The interior is no less attractive than the exterior and is consistent in its architectural treatment. Arched openings predominate, the walls being furred out on the inside to give the effect of great wall thicknesses necessary for consistency in the adaptation of the Spanish style. The ceiling is finished with exposed wooden beams, the soffits of which are painted in an attractive conventional design. While ample window areas are provided, the avoidance of excessive natural light plus



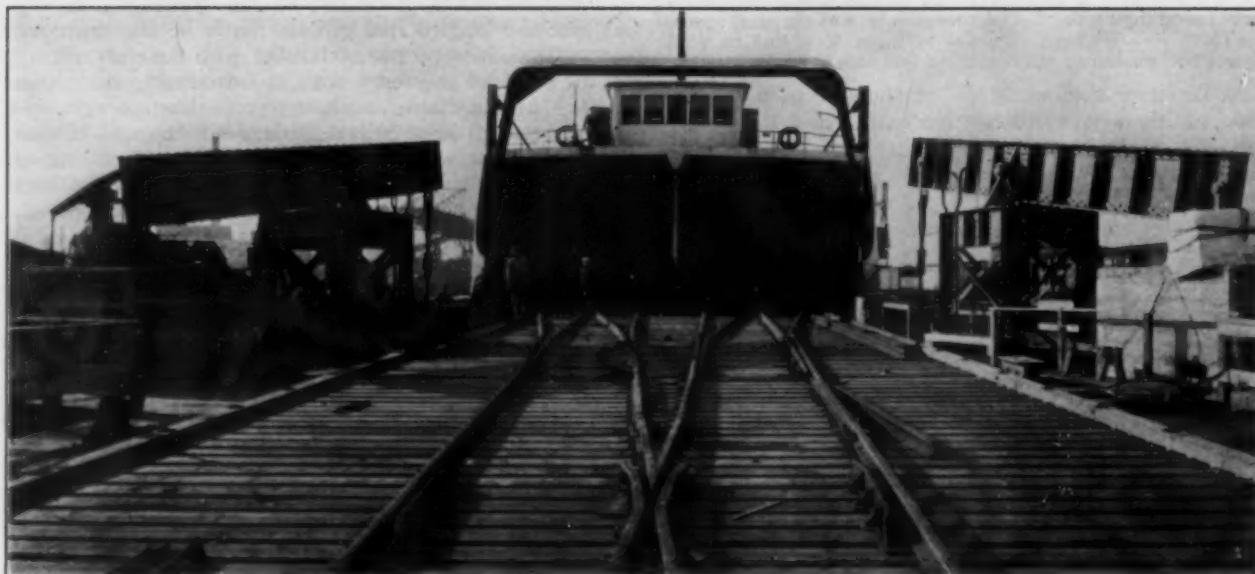
Spanish Architecture Is the Dominating Feature in the Treatment of Both the Interior and Exterior of the Station

vided for passengers under canopies and umbrella sheds outside the building.

The station building is only one story in height but the portion occupied by the main waiting room, 26 ft. by 52 ft. in plan, has its roof at a sufficient elevation to permit of a ceiling height of 20 ft. in the waiting room. As seen in the photograph of the front elevation, the dominating feature is the main doorway which is designed as an archway ornamented by two spiral fluted columns, the arched window over the doorway being the principal source of natural light in the waiting room. The roof is a simple flat gable covered with Spanish tile and equipped for a belfry tower at one corner, suggestive of the missions in Mexico and the southwest. The

the general simplicity of the interior has been responsible for a cool, restful effect that is especially desirable in the semi-tropical climate. Artificial illumination is provided by six electric lamps in the form of tastefully designed lanterns suspended from the ceiling. The floor is of concrete with center and border ornamentation in tile. The walls, including the wainscot, are finished in plaster with the wainscot set off by a tile base and a Faience tile cap.

To the right of the waiting room are separate rest rooms and toilet facilities for men and for colored passengers, while to the rear is a rest room and toilet facilities for white women, a ticket office and a baggage room.



Looking Toward the Outboard End of the Apron with the Stern of One of the Car Ferries in the Background—Note the Lever Girders and Counterweights at Each Side

Grand Trunk Western Builds Flexible Apron for Ferry Slip

Ingenious design adopted at Milwaukee permits warping of steel frame without injury

THE Grand Trunk Western has extended its facilities at Milwaukee, Wis., to provide for the handling of two additional car ferries to supplement its line of car ferries operating between Milwaukee and Grand Haven, Mich. The new ferries are somewhat larger than those now in service and are capable of handling more tonnage. To facilitate the handling of cars to and from the ferries at Milwaukee a new slip with a loading apron has been constructed adjacent to the present slip.

The older steel loading aprons in use at the various points on the system, where car ferries are operated, are adjustable for differences of elevation but are of rigid steel construction with timber decks. Considerable difficulty has been experienced in maintaining this type of apron due to the high stresses occasioned by the tilting of the ferries from side to side during the loading and unloading operations. At one point the main cross girder which carries the dead load of the outer end of the apron to the supporting counterweight beams was found to be badly buckled and a number of the rivets sheared. At the time this occurred it was believed that these conditions could be prevented by a more rigid and heavier cross girder construction to replace the damaged one, and repairs were made in this manner. However, after a period of seven years, it is evident that this design has not given a satisfactory solution.

Adopt Flexible Design

The problem was then approached from a different viewpoint and it was decided to provide a structural steel apron with the usual type of timber deck, but which would be flexible and which would warp freely to

conform to the position of the stern of the ferry during the loading and unloading operation. On investigating the conditions to be encountered it was found that:

1—There would be a difference in elevation between the position of the stern seat of the ferries, light and loaded, amounting to six feet.

2—There would be a tilting of the plane of the stern seat during the loading and unloading operation of about three degrees from the horizontal. This caused a difference of elevation of one foot between the two sides of the apron at the ferry end.

3—The elevation of the base of rail of the ferry above water

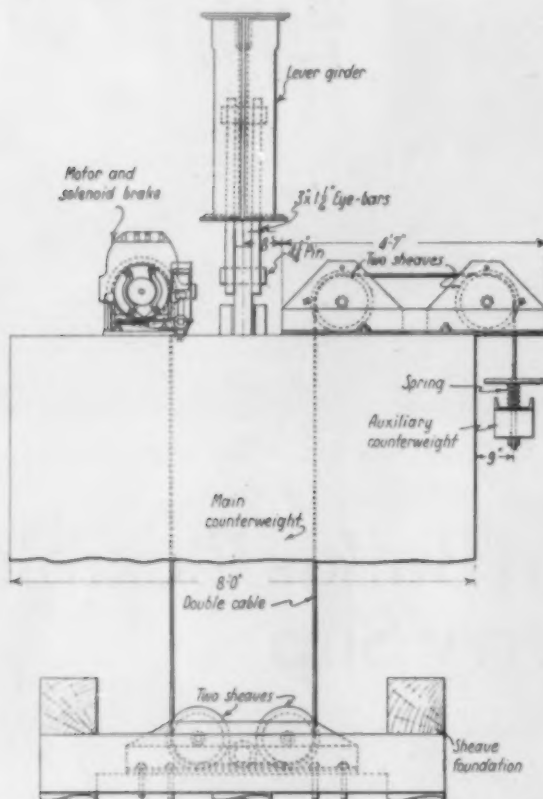


The Ferry Apron as Seen from the Slip

level when loaded is reduced to an extent which imposes a restriction on the depth of structural members of the steel apron.

4—There is a frequent variation in water level due to wind and weather conditions amounting to one foot.

To facilitate the operation of the apron in its extreme positions it was desirable to increase the length



Arrangement of Main and Auxiliary Counterweights

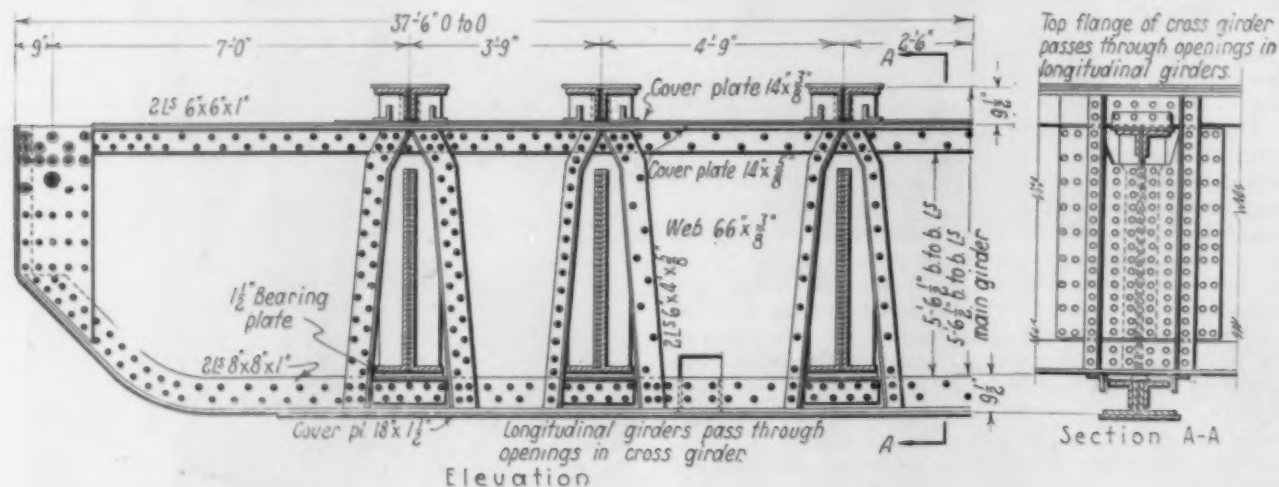
over that of the older aprons, and 75 ft. was adopted as the overall length. The general arrangement consists of six longitudinal deck girders supported at the

elevation as indicated on one of the drawings. In order that the longitudinal girders might be free to move vertically with respect to each other with the ends resting on the stern of the ferry without introducing distortion stresses in the frame work, no cross frames were installed between longitudinal girders but top and bottom lateral systems were provided with pin connections to the girders, thereby maintaining the girder members parallel without restricting the vertical movement.

The cross girder was designed as a truss with solid web members, the upper chord passing through the openings in the main longitudinal girders while the bottom chord is provided with special bearing shoes to receive the load from the longitudinal girders. Stop blocks were provided to prevent an excessive movement of the cross girder, there being no rigid connection between this and the main girders.

Lever girders supported on steel towers erected on each side of the apron, as shown in one of the photographs, provide the means of transferring the load carried by the cross girder to concrete counterweights. Each of these counterweights is provided with holes to receive pieces of scrap rail as required to adjust the balance between the counterweights and the apron. The operation of the apron is controlled by a double set of standard single-drum electric hoists, each wound with double cable. These hoists are mounted directly on the counterweights and the cables are reeved over double sets of sheaves to a small tension counterweight with a spring shock absorber suspended at one side.

The hoists are wired for remote control at a point near the ferry end of the apron. The sequence in the operation of the apron is as follows: (1) When the apron is not in use it is held in a raised position by solenoid brakes built into the motor hoist; (2) when the ferry enters the slip the motor is reversed, which permits the apron to lower automatically until the end rests on the stern seat of the ferry; (3) the motor continues in reverse motion until a pre-determined amount of slack is provided in the cable. This is taken up by the auxiliary counterweight which maintains a normal tension and prevents the cables from jumping off the sheaves. A built-in limit switch automatically cuts off the current



Design of the Coast Girder

heel or shore end by large steel castings and phosphor bronze trunnion bearings, and at a point near the ferry end by a cross girder designed to support the dead load of the apron and connecting with a system of lever beams and counterweights to provide for the adjustment for

when the right amount of slack has been paid out. The apron rests on the stern of the ferry as the ferry tilts without straining any portion of the structure or mechanism. A connection is maintained between the ferry and the apron by means of a special latch which con-

nects with a recess at the stern of the ferry. (4) After completing the loading and unloading of the ferry the latch is released and the motor started. The apron, however, does not lift until the auxiliary counterweight bears on the projecting structural frame, which permits the hoists to lower the counterweight, thereby raising the apron. When the apron is back at the predetermined height a limit switch cuts the current and the solenoid brakes automatically hold the apron in position.

To provide against the possibility of failure of the current, two three-ton Yale screw type chain blocks are provided to hook into the frame of the counterweight, thereby providing for manual operation in an emergency.

The entire project is in charge of J. A. Heaman, chief engineer, Grand Trunk, Detroit, Mich. The design was prepared under the direction of A. N. Laird, assistant engineer, Detroit. Field construction was supervised by A. L. Ray, assistant engineer, Durand, Mich. The timber and dock work was performed by the Edward E. Gillen Company of Milwaukee while the mechanical and electrical equipment was furnished by the Palmer Bee Company of Detroit.

Telegraph Section Concludes Session

THE Telegraph & Telephone Section of the America Railway Association, at its final session in Washington, on Thursday, October 6, devoted most of its time to radio, an informal talk by Admiral W. H. G. Bullard, chairman of the Federal Radio Commission, being the feature of the forenoon session.

The principal committee report left over from Wednesday (Tuesday's and Wednesday's doings were reported in our last issue, page 686) was that of Committee No. 12 on radio and wire carrier systems, G. T. Stanton (N.Y.C.), chairman.

The interests of the railroads in the radio field are being watched by this committee. The Canadian National Railways have conducted tests between moving cabooses and fixed points, and intend to try front to rear end communication.

The radio control law of February 23, 1927, established the Federal Radio Commission, which commission has wide powers in the control of radio. This law empowers the commission to exclude from the requirements of any regulations, any radio station upon railroad rolling stock; or to modify such regulations in its discretion.

A sub-committee has been appointed to prepare a report outlining the wave lengths and power limitations required for railroad radio service. This report, based upon the meager data available at this time, will be used by the committee at the International Radio Conference now being held in Washington, as a basis for securing the protection of the necessary wave lengths to accomplish the specific desires of the railroads.

Supplementing the formal report, the committee presented additional data including a careful and detailed description of the General Electric Company's radio apparatus for telephoning from rear to front of long trains, which has been tested recently on the New York Central; in which tests the railroad company, the General Electric and the committee co-operated. Results have been very satisfactory, but a final report must wait until the committee can test later instruments and fixtures, (redesigned upon the basis of experience already acquired)

which will be ready within a few weeks. Fading of impulses, due to the influence of bridges or other large steel structures, and to tunnels, continues to be a factor which must be dealt with.

The radio apparatus has also been used at a hump yard, being installed in the booth occupied by the conductor, and enabling him thus to give his order to the pushing engine. The General Electric Company is already prepared to make yard installations on a commercial basis.

The committee also described briefly a radio apparatus for long freight trains which has been made by the Westinghouse Electric & Manufacturing Company but which has not yet been tested in actual main line train service. A simpler arrangement, giving only whistle signals (not conversation) has also been developed.

Admiral Bullard's talk gave the members interesting first-hand information concerning what the government is doing and is likely to do. He commended front-to-rear-of-train communication, urging the railroads to develop the art and assuring them that simplicity and economical operation would be found readily attainable; but gave warning that interference might be a troublesome problem. The air is already "jam-full" of radio waves and the adjustment of contesting claims will call for heroic treatment. He advised the railroads to be early with their applications for air rights. (The committee responded that active measures were being taken in this direction.)

The number of broadcasting stations in the United States has been reduced to 670, but the amateurs number over 16,000. The Admiral seemed doubtful about the conclusion of the committee that front-to-rear radio could be worked satisfactorily, using power which would carry three to four miles in service and be safe from interference for 17 to 18 miles. "Why," said he, "four-watt apparatus carries to South Africa!" His board has had complaints from radio senders that nearby highway crossing bells trouble them. One automobile maker has had radio sending apparatus installed in an automobile; suppose other manufacturers follow his example: the interference problem may get beyond all manageable bounds. Radio users may have to divide the hours of the day. The government may be compelled to adopt regulations giving priority to the more important users of the air. The Federal Radio Commission will not encourage the use of radio where good wire communication is available, as between large cities which are well provided with telegraph and telephone wires. Admiral Bullard told the telegraphers that for their long freight trains they should use "wired-wireless" (the invention of General Squier).

A feature of Thursday's session was a 14-page discussion of organization and traffic problems by J. C. Rankine (G.N.) containing innumerable suggestions for the promotion of efficient service. The wire chief should be carefully educated and trained. System conferences of relay-office managers should be held at least once a year. Classification of service and encouragement of deferred message service are important elements of economy. Censorship of messages is important but it is not the Telegraph department's job.

J. C. Johnson (Penn.), discussing Mr. Rankine's paper described the telegraph facilities and organization of a typical heavy P. R. R. division. To cope with the aurora borealis he had found it desirable to provide metallic circuits. At Pittsburgh the four telegraph offices of four railroad divisions had been consolidated into one, with marked economy. Operators' work should not always be measured by the number of messages handled. Constant censorship is perhaps questionable, but special attention to a certain office on a certain day, following

up all careless and faulty message-writers, will produce good results. The Pennsylvania has its own code for promoting brevity, and neglect of its advantages is not overlooked.

E. C. Keenan (N.Y.C.) said that although censorship is not a cure-all, something of the kind must be maintained; clerks and others not of the highest responsibility have too much freedom to prepare telegrams according to their own notions. The night mail must be fully availed of; without this relief certain N. Y. C. offices would have to have more operators. As to education of operators for the position of wire chief, the committee of this Section (No. 10) ought to edit the information developed at conventions for the benefit of aspiring operators. Mr. Keenan deems the establishment of an adequate number of telephone circuits for messages, within the limits of the division, the most important immediate problem.

The election of officers for the ensuing year resulted in the choice of the following: For chairman, W. Rogers (M. P.); first vice-chairman, J. McMillan (C. P. R.); second vice-chairman, E. C. Keenan (N.Y.C.). W. A. Fairbanks, New York, is secretary.

Pullman Tipping Complaint

WASHINGTON, D. C.

TAKING the position that the tipping of Pullman porters is a matter between the passengers and the porters, and has nothing to do with the service which the company renders or undertakes to furnish to its passengers, the Pullman Company has filed with the Interstate Commerce Commission a motion to dismiss the complaint recently filed by the Brotherhood of Sleeping Car Porters which attacked the tipping system as one encouraged and permitted by the company and as constituting a discrimination between passengers.

In a memorandum accompanying the motion the company points out that it does not receive the tips and it also takes the position that the commission is without jurisdiction of the subject matter and without authority to grant the relief prayed for.

"The object sought by complainant," it says, "is to bring about a change in the relations between the defendant and certain of its employees, respecting wages and terms of employment," which are not within the province of the commission, and "a palpable effort to accomplish by indirection what may not properly be accomplished by direction. The real purpose of petitioners is to secure an increase in wages and a change in working conditions."

However, replying to the specific allegations of the complaint claiming violation of various sections of the interstate commerce act, the company says that the tips are given to the porters and not to the defendant, that there is no obligation on the part of passengers to give gratuities, that they are not uniform but depend upon the inclination, whim, or caprice of the passengers; that it does not require the porters to differentiate in the amount and quality of service which the company renders or undertakes to furnish to its passengers. Therefore, it says, "the giving of gratuities or tips by passengers to the porters does not constitute the making by the defendant of an unjust or unreasonable charge under Section 1 of the act, nor any charge by the defendant; that there is no discrimination under Section 2; that there is no undue or unlawful preference under Section 3; and that such gratuities or tips should not and cannot lawfully be shown in the defendant's tariffs or schedules and there is no violation of Section 6 of the act."

Progress in Abolishing Crossings in New York

AT the conference in Albany on October 10, called by Governor Alfred E. Smith some weeks ago to consider the difficulties which have been encountered in the administration of the grade crossing laws of New York, all of the railroads of the state were represented, most of the important lines by their presidents, with other leading officers. The wishes of the Governor, as heretofore made public, were very generally acquiesced in by the railroads, and the elimination of 276 crossings within the next 15 months was substantially agreed upon. All of the roads, except the Staten Island, expressed willingness to go ahead under the terms of the present law. The New York Central, the Long Island and the Pennsylvania announced that the privilege of borrowing money from the state for crossing elimination, as provided for under the three-hundred-million-dollar acts, would not be availed of. It is assumed that many of the roads will borrow from the state. Of the 276 crossings, 74 are within the limits of the City of New York, this number including, however, the 42 on the Staten Island, above referred to. This road already has a case before the courts contesting orders of the state authorities requiring the abolition of certain crossings.

Under a proposed constitutional amendment, which is to be voted upon by the citizens of New York next month, counties will be authorized to provide a portion of the funds for the elimination of any given crossing. This amendment, if adopted, will afford relief in those cases where the removal of a dangerous crossing has been deferred because the town lacked the financial ability to bear the 25 per cent of the cost which under the present law, must be borne by the municipality.

W. G. Lancaster, chief engineer of the Transit Commission, presented a comprehensive plan of the work proposed in New York City. This includes on the Long Island, Corona, estimated cost \$1,000,000; Springfield, \$1,400,000; St. Albans, \$600,000; Rockaway Park to Arverne, \$7,000,000; and the following extensive projects with which no estimated cost is given: Arverne, Hammel, Holland, Steeplechase, Seaside and Rockaway Park. Also three crossings on the New York Central in Manhattan, North of 72nd Street, \$780,000. (On other crossings in this Manhattan territory action has already been taken.)

Outside of New York City the program, to the end of 1928, as prepared by the Department of Public Works, includes the following items, which aggregate upward of \$33,000,000:

New York Central, 44 crossings.....	\$7,137,000
Long Island, twelve crossings.....	4,780,000
Erie, twenty-seven crossings.....	4,297,000
Lehigh Valley, 26 crossings.....	3,562,000
Delaware & Hudson, 19 crossings.....	3,265,000
Delaware, L. & Western, 19 crossings.....	2,660,000
Pennsylvania, twelve crossings.....	1,620,000
N. Y., Ontario & W., 12 crossings.....	1,510,000
West Shore, ten crossings.....	1,480,000
Buffalo, Roch. & P., two crossings.....	1,220,000

The nineteen other crossings involved in the program are found on the Boston & Maine; International Railway; Jamestown, Westfield & Northwestern; Ulster & Delaware; New York, New Haven & Hartford; Rutland; Pittsburgh, Shawmut & Northern; Arcade & Attica; and the New York, Chicago & St. Louis.

Governor Smith, at the conclusion of the conference, expressed himself as delighted at the outcome of the deliberations. He said that possibly not all of the crossings in the state, for which work is now planned, would be continued in the program; that other crossings might be substituted in their place.



Conditions Like This Disappear with Better Information About Material

The Neglected Science of Railway Storekeeping

*Classified reports of material uniformly kept by all
are keys of stock control*

Part II

By R. A. Weston

Certified Public Accountant, New Haven, Conn.*

DURING Federal control, the railroad had no uniform method of accounting for the large sums spent for material, and in many cases the accounts were defective. There was no accurate information as to what material was available for use. Although the roads were spending 35 per cent of their gross earnings for material, there were at least 29 roads, and among them some important trunk lines, which had no means of determining how this large amount of their income had been applied. They could not tell how much of their total investment was represented by fuel, rail, ties or any other kind of material, except that 13 of them had kept separate records of their fuel, and neither these roads nor many others could tell how much material of various kinds was being used from month to month. In many other cases the information that was given proved to be inaccurate. It was under such conditions that more than one hundred million dollars were being expended every month.

One of the early accomplishments of the Railway Storekeepers' Association was to classify the materials and supplies carried in stock for use on railroads. One class included rail, another ties, another fuel, others interlocking and signal materials, locomotive, train and station supplies, etc. This classification was so drawn

that the materials used chiefly for maintenance of way and structures fell into one group of classes, those used for maintenance of equipment into another, for conducting transportation into another, while a fourth group covered materials that were used in common by all departments. In 1921 similar work was done in the American Electric Railway Association for street railway and interurban lines, and during the past year this has been extended to include materials for buses.

Statements Reflect Turnover

It is necessary, if the stock is to be controlled, for transportation systems to adopt classifications, and install accounting systems that will permit the total value of the investment in materials to be split up according to material classification, and in addition, to classify all receipts and issues of material in the same manner. Under a system, each storehouse point, or each storekeeper in charge of certain territory, can and should render a statement each month, showing the following information:—

- Value of material on hand first of month.
- Value of material received during month.
- Total material available for use.
- Value of material issued and transferred during month.
- Value of material on hand at close of month.

From these figures it is possible to determine the relationship between the value of the material available

*Mr. Weston, whose first article appeared in the issue of September 24, is a former general storekeeper of the New York, New Haven & Hartford.

and the material actually used, or in other words, the turnover, which should be a reasonable one. It is extravagant and wasteful to be maintaining a large stock of material in any particular territory unless a reasonable per cent of it is being used. A merchant is not successful unless he has a reasonable turnover of his stock. While it is hard to lay down any general rule, what a reasonable turnover is can be determined approximately from the performance being made by those railway systems which are most advanced in their methods and in their systems of caring for and controlling the investment. One authority believes that for maintenance of way materials, any road should be able to operate, regardless of its distance from markets, with somewhere around four months' supply of materials, and that for motive power materials, excluding fuel, it should be able to operate with somewhere around a three months' supply, but most roads are not operating that way. Such figures should certainly be a mark to aim at by roads not doing as well.

The first monthly statement from each store territory should be a summary of operations that will show a comparison of the status and use of the investment between the various units in the store territory. With proper allowances for different conditions between any two points, the two units should be making a somewhat similar showing. If one has a much better showing than another, the other is a weak spot in the system calling for a detailed investigation. Taking an actual case where storehouse "B" and storehouse "C" of a system are working under similar conditions, why is it, for example, that during the year storehouse "C" is working with a 90 days' supply, while storehouse "B" has a 137 days' supply and, again, how did it come about that storehouse "B" increased from a working basis of 106 days' supply in the previous year to 137 days in the current year and that storehouse "C" reduced its stock from 220 days in the previous year to 90 days in the current year. These are the type of questions suggested by such a statement and a general storekeeper should not be satisfied until he knows the real reason for the differences. He is greatly assisted in this by classified statements of the material.

In accordance with the best practice, the accounting department will install and either prepare or direct the preparation of a system under which there will be a material classification ledger for each store territory, in which will be kept an account in dollars for each class of material. The class will be charged with the inventory and with the receipts, and will be credited with the materials issued and used. These accounts will be controlled by the one account "General Stores" in the general ledger. When the accounts are closed each month, a statement will be drawn off from the material classification ledger for each store territory.

The information contained in this classified report permits an intelligent conclusion to be formed, in considerable detail, as to the efficiency with which each store is being managed, and by a consolidation of all reports into one report, judgment as to the department as a whole. It is such a report that should be studied by the storekeeper, the general storekeeper and executives.

For a particular store, or for a particular road, it should be possible to determine fairly closely what the per cent of disbursements should be, or in other words, how large a stock should be carried of a certain character, based upon the amount of material being consumed. This gives a criterion by which to judge a storekeeper's ability. By making comparisons between stores,

by making allowances for different conditions, by gradually bringing each store up to the mark of the one that makes the best showing, by establishing a mark at which to aim, it is possible to raise the standard of operation and gradually approach the maximum percentage compatible with satisfactory service, and when this is accomplished, good regulation has been obtained.

Considering storehouses "B" and "C" again, to use an actual case, and comparing the statements of each, it is found, for example, that storehouse "B" is disbursing monthly 31 per cent of its available stock of brass castings and journal bearings, whereas storehouse "C" is disbursing 55 per cent. Again, storehouse "B" is disbursing 10.4 per cent of its available stock of bolts, nuts, and washers against 20 per cent for storehouse "C." This gives the further clue to the weak spots in storehouse "B's" operations, and with this clue, the stock books covering these classes of material are called for and examined in detail. This discloses individual items of surplus material and steps can then be taken to remove the surplus to other storehouse points, instead of purchasing, thus reducing the stock as a whole. Without a material classification, and without such reports as have been described, it would still be possible, if the stock books are carefully kept, to go through them and cull out surplus materials, but there would be no clue to direct the examination, and the process would be much longer and more burdensome, and the relief would be slow. Without the stock book one might be satisfied that there was a surplus stock, but entirely at sea as to how to go about it to regulate it or redistribute it.

The third step with respect to the classified material reports of individual stores is to consolidate them into a statement for the system. In such a consolidation the transfers from other classes and from other stores will balance, and the real disbursement or use of material is represented by the two columns headed "Used" and "Sold," and the total material available to be used is the sum of columns "Materials Purchased" and of "Materials Received by Credit," that is to say, released from operation.

Finally, what a helpful thing it would be if such a road had available for comparative purposes, a corresponding statement of another system, in a general way comparable with itself, which showed, say, a figure of 21 per cent disbursed as compared with the figure of 13.8 per cent of the first road. Would it not more than pay the first mentioned road to have its general storekeeper study the conditions and methods on the second road? If as a result he could reach 21 per cent for his road, he could reduce the material available each month from \$3,901,222 to \$2,556,271, to use an actual case, it would mean that a difference of \$1,344,951 could be invested in some other manner.

If such a system of accounting and reports could be generally adopted, and the results could be collected by the Bureau of Railway Economics and the information included, and disseminated monthly in the statement of operating data of all Class I carriers, so that each could measure the accomplishments or short comings of its store department by comparisons with those of its neighbors, it would be one of the best steps to render possible a better service of supply, and a better control over the investment in materials and supplies.

A RATE OF 281 MILES AN HOUR is reported as the speed attained, flying in a monoplane, by Lieutenant S. M. Webster, at Venice, Italy, on September 26. The flight covered 218 miles in 46 minutes, 20 seconds, or at the rate of 4.69 miles a minute.

The Beginnings of the B. & O.

Contemporary comment discloses daring feat of building railway was greeted enthusiastically

JUST a century ago engineers were busy proving to skeptics that a locomotive, drawing heavily loaded wagons, could be operated over a railway at a speed as high as four miles an hour. Applying this to the proposed railway from Baltimore to the Ohio river, they maintained that the journey could be made in 62½ hr., whereas the time required in transporting freight from Baltimore to Pittsburgh via canal was 214½ hr. Thus a railway would save 152 hr. for the trip.

The income to be derived from the proposed railway annually, based on the current canal rates, was estimated as follows:

150,000 tons from West to East at 1 cent per ton per mile.....	\$375,000
50,000 tons from East to West at 3 cents per ton per mile.....	375,000
Total amount of tolls.....	\$750,000

The estimate of the profits to be derived by the stockholders shows the following:

Expense of constructing the proposed road at \$20,000 per mile, 250 miles	\$5,000,000
Six per cent interest on the above capital.....	300,000
Income from tolls.....	750,000
Balance for repairs, contingent expenses, and surplus dividends..	450,000

This information appeared in the *American Farmer* for May 18, 1827. That journal devoted much space to the budding enterprise during the remainder of the year, and, in view of the B. & O. centenary celebration now being held, its reports and comments, printed 100 years ago, are now of particular interest.

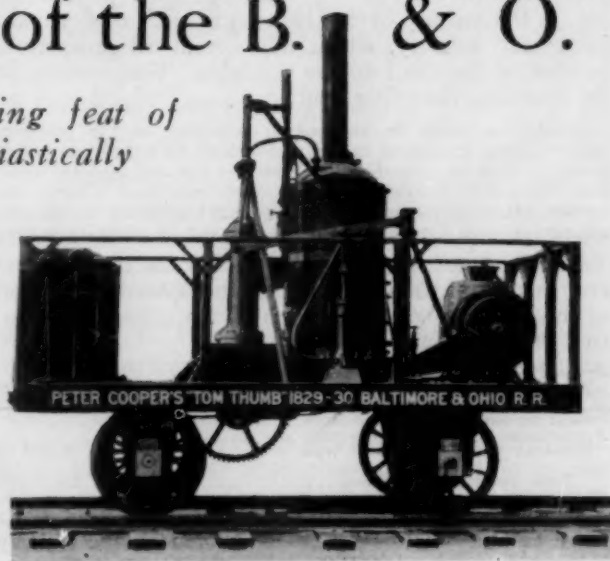
Opinion of Railways a Century Ago

The editor of the publication explained his enthusiasm for the new and untried enterprise in the following quaint language:

We hold it to be our duty to give a sketch of the measures taken in relation to this great enterprise, whether it be destined to succeed or to miscarry. We hope the facts and illustrations adduced will be useful to those who may, in the future, be charged with enterprises of a similar character, in other parts of our widely extended country. Steam is just now coming to be known. Fifteen years ago there were no steamboats and now hundreds of them ply our waters. It is safe to predict that hundreds of locomotives will one day traverse our land.

According to the report of the committee appointed by the stockholders, the prime reason for building the railway was to attempt to regain its western trade, which was gradually being diverted to Philadelphia and New York. One member of the committee, more rash than the rest, said:

We have estimated our possible freight at 150,000 tons eastward and 50,000 tons westward annually. To some unthinking persons, these may seem large figures, but it may be, as our inland empire develops, that we shall one day see half a million tons of freight moving in each direction annually.



Railway Possibilities Reviewed

The committee went to great lengths to secure the best opinion then available as to the possibilities and capabilities of railways. Among the facts they were able to produce were the following:

Where an intermediate space between any two places, at a considerable distance apart, admits of being made so nearly horizontal as not to deviate more than 27 ft. 6 in. a mile, locomotive engines may be employed to great advantage.

A high pressure locomotive engine, working with two 8-in. cylinders, and weighing five tons, may draw on a level 27 wagons, weighing 94 tons, at the rate of 4 miles an hour; when lightly laden, it will travel 10 miles an hour. The cost of one of these engines is \$2,000.

A railway is equally suited to a mountainous or level country, and either horses or locomotive engines may be used on it, though not with advantage at the same time, from their difference of velocity. Where a railway is level, the power required to move the wagons is little more than the friction, which is found to amount to about a 200th part of the weight to be conveyed; or, in other words, a power of 1 lb. applied in the direction of the motion, will draw forward 200 lb.

A locomotive engine of ten horse power will draw 120 tons, at the rate a draught horse travels, or 50 tons at the rate of six miles an hour. The engine requires the attendance of only a man and a boy, at a daily expense of \$1.25. The coal consumed in 10 hours would be from 2,000 to 3,000 lb., therefore, the expense altogether would be less than \$7.50 a day, for which 50 tons may be conveyed 60 miles in 10 hours.

It is to be remarked that the rate of traveling may be increased to surpass that of our fastest mail coaches, and that a locomotive engine will as readily convey 25 tons, including its own weight, at 12 miles an hour as double the weight in twice the time.

A Notable Record

On a railway in England, a locomotive engine in 54 weeks conveyed 53,823 carriages of coals, each weighing 9,438 lb., 2,541 yards and returned with the same number of empty carriages, each weighing 3,472 lb. In that time the engine, for want of goods to convey, was at least 20 days off work, so that in 304 days the performance was 446,815 tons conveyed one mile, or 1,470 tons, one mile each day. This engine had three-foot wheels; with larger wheels, the difference between the horses and locomotive engines will be correspondingly increased.

A railway can, according to circumstances, be made at from half to a fourth of the expense of a canal, and convey goods more cheaply, which would render railways lucrative when any other mode would be ruinous.

When a railway is once completed, the repairs would not be so heavy on common turnpike roads, owing to the good and substantial foundation which must be laid to begin with.

Great stress was laid on the fact that the rapid transportation afforded by the railways would attract traffic which could not be moved any great distance by canal.

This had reference to fish, fruit and other perishables, but, in the vicinity of Baltimore, the chief concern was the oyster industry, which was not at all prosperous, because of the small market available. Commenting on the situation, the editor said:

Should the result be realized in reference to the proposed railway from Baltimore to the Ohio river, an extensive market would at once be opened to the West for fish and oysters, which must necessarily increase the value of our numerous fisheries and oyster beds to an enormous extent, besides sustaining an immense augmentation of the tonnage on this bay and its tributary waters.

The effect of the proposed railway on the value of real estate in Baltimore was not overlooked. A report of the United States Engineers on the subject summarized the situation as follows:

Appreciation of real estate in the counties adjacent to the line of road.....	\$12,000,000
In the western states benefited by the roads....	17,280,000
Present estimated value of real estate in Baltimore	\$20,000,000
Appreciation of real estate in that city in consideration of the increase of trade.....	10,000,000
Total property appreciation.....	\$39,280,000

It was pointed out that the territory between Baltimore and the Ohio river, to be served by the railway, contained nearly 2,000,000 inhabitants, or one-fifth of the population of the United States. An elaborate table was worked out by the U. S. Engineers, estimating how



Early B. & O. Freight Cars

much traffic such territory could be expected to produce for a railway, and it was presumed to be 200,000 tons annually in all. The highest estimated cost of the proposed railway was \$5,000,000, which would leave a very satisfactory annual return. It was estimated that the actual cost of transporting a ton of freight by rail between Baltimore and the Ohio river would be \$2.50, as compared with the prevailing cost of \$5.85 via the canal system.

Many Routes Proposed

As soon as the news of the railway's plans reached the West, petitions were sent in requesting that it be extended to various territories.

A committee of citizens of Ross county, Ohio, prepared a voluminous petition, giving reasons why the railway should be extended through Ohio and Indiana. They pointed out that, while at the time, the Scioto valley had only 150,000 inhabitants and the population grew sparser farther west, the possibilities of the states of Ohio and Indiana were enormous, and they might, in time, come to support two or even three million people.

The citizens of Kanawha county, now West Virginia, and then part of Virginia, presented a survey made by Thomas Moore, civil engineer of Virginia, and recommended strongly that the new line reach the Ohio by means of the New and Kanawha River valleys, suggesting almost exactly the route over which the Chesapeake & Ohio was to be built later. The engineer's survey described the territory as wild and totally unsettled until

Kanawha county was reached. He stated, however, that he was certain that a railway could be built along the banks of the river, mentioning that the huge rocks which had fallen from the hills above would be an advantage rather than a handicap, since they could be used in making the roadbed. His report mentions the fact that certain indications convinced him that coal was to be found in the vicinity.

Pittsburgh citizens urged the necessity of building a branch into that city as well. Their petition stated that Pittsburgh was a rapidly growing city, having 2,600 men employed in its factories and 31 steam engines in operation. One ardent enthusiast on the committee predicted that Pittsburgh would one day be a city of 250,000 people.

The Difficulties of Survey

The surveying parties sent out experienced many difficulties in the wilderness, according to the reports they rendered to the committee of shareholders. Several of them became ill from exposure, while practically all of them suffered severe frostbites. The American Farmer deemed these reports of sufficient importance to quote most of them in full. Their final conclusions in the matter are contained in a report submitted on November 6, 1827, by the leader of the party, S. H. Long, a brevet lieutenant-colonel, temporarily detached from Army service. The report said, in part:

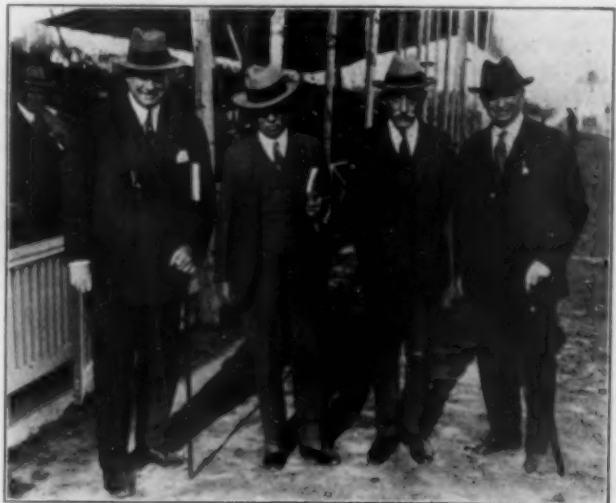
We have found the country more favorable to the accomplishment of such an object as that of the contemplated railroad, than could have reasonably been expected from its rough and broken aspect. Great facilities for the construction of such a work have, on a careful examination, with the object in view, been developed, where a superficial observation could hardly have led to expect them; and when minute and accurate surveys shall have determined the precise features of the country, we may anticipate the discovery of still greater facilities.

The difficulties which occasionally present themselves, it is true, are great, but we have met with none which we do not even now think that we perceive the modes by which they may be successfully overcome; and when science and experience shall have increased our resources we may reasonably expect that with their aid, these obstacles will diminish to a much lower point than that at which we have now estimated them.

It is also necessary to remark, that interspersed with these difficulties are considerable extents of favorable ground, which, by the facilities they will afford, will compensate for the expenditure accumulated on the rougher portions, and thus reduce to a reasonable amount the average cost of the whole work.

Our conclusions, founded as they are, on a mere examination by the eye are of course liable to error.

* * *



Distinguished Visitors at B. & O. Pageant

Left to right: Sir Henry Thornton, P. E. Crowley, Andrew Mellon and Daniel Willard.

Chesapeake & Ohio

Heavy demand for non-union coal has brought great increase in tonnage and in net earnings

CHESAPEAKE & OHIO common stock has recently had a sudden rise in price, which carried it from approximately 195 a month ago to a high of 218½ on October 3. It is now selling around 205. This price compares with the low price for 1927, late in January, of 151¼, the present quotation thereby representing an increase in price of about 50 points. Chesapeake & Ohio is now paying dividends at an annual rate of \$10 per share, which rate was begun with a quarterly payment of 2½ per cent on July 1, 1927. In 1926 the

ings this year than Chesapeake & Ohio. One of these is Michigan Central and the other is Hocking Valley, the latter being controlled by the Chesapeake & Ohio by ownership of 80 per cent of its outstanding stock.

Increase of 12 Per Cent in Coal Loadings in 1927

The reason for the present favorable earnings of the Chesapeake & Ohio is found in the continuation into 1927 of the expansion of the coal traffic. Coal now constitutes about 85 per cent of all Chesapeake & Ohio tonnage. The following table gives a comparison of the coal loadings of the Chesapeake & Ohio and of the other roads in the Pocahontas region this year and last to date:



	Chesapeake & Ohio		Other roads in Pocahontas Region	
	1927	1926	1927	1926
January, 4 weeks	89,981	88,203	85,395	81,079
February, 4 weeks	89,164	81,656	80,340	77,632
March, 4 weeks	90,597	75,765	79,621	68,921
April, 5 weeks	107,357	86,289	95,129	81,042
May, 4 weeks	96,096	85,824	82,593	77,544
June, 4 weeks	93,474	88,822	77,047	82,129
July, 5 weeks	108,407	106,740	89,274	104,369
August, 4 weeks	102,512	87,744	80,683	86,871
September, 3 weeks	76,528	65,223	62,373	64,669
Total, 37 weeks	854,116	766,266	732,455	724,256

The Chesapeake & Ohio coal tonnage this year is now 12 per cent ahead of last year's, whereas the other roads



The Chesapeake & Ohio

company paid regular dividends of 8 per cent plus a special dividend of 4 per cent, making the year's dividend disbursements \$12 per share.

The following gives a comparison of the earnings for the first eight months of 1927—the latest reported—with those of the same period of last year.

Eight Months' Earnings			
	1927	1926	Increase
Gross revenues	\$90,310,155	\$85,948,905	\$4,361,250
Operating expenses	60,842,045	59,920,069	921,976
Net railway operating income	24,910,691	22,936,428	1,974,263
Net income after all charges	19,677,335	17,524,168	2,153,167
Operating ratio	67.4	69.7	Dec 2.3
Per cent net operating income to total operating revenues	27.6	26.7	0.9

The Chesapeake & Ohio, therefore, is one of a very few roads that have done better this year than last. It is estimated that the 1927 earnings are equivalent to \$26 per share. This compared with \$24.64 for the year 1926. Earnings of \$26 per share are equivalent to 2.6 times the present 10 per cent dividend requirements. Only two large railroads have reported larger per share earn-

in the Pocahontas region have had an increase of only 1 per cent. It was expected that as conditions became more normal in the northern fields the Chesapeake & Ohio would prove less able to continue the greater percentage of improvement that it has been showing over other roads serving non-union fields. President Harahan recently stated his expectation that the 1926 earnings would not again be exceeded until 1930. The Chesapeake & Ohio, however, seems to have had no difficulty in maintaining and improving its new position and, as above noted, the 1926 earnings are already being exceeded by those of 1927.

The Chesapeake & Ohio is now controlled by the Van Sweringen interests. This control is exercised through the Vaness Company and the recently established Chesapeake Corporation. The latter on April 19, 1927, owned 600,000 shares of Chesapeake & Ohio stock or 50.4 per cent of the total of 1,190,080 then outstanding. A majority of the stock of the Chesapeake Corporation is owned by the Vaness Company, 80 per cent

of the stock of which is held by O. P. and M. J. Van Sweringen. The percentages so work out that the two brothers have a 29.679 per cent interest in the Chesapeake & Ohio. In the merger plan now being considered the Van Sweringens propose to turn over to the Chesapeake & Ohio their majority holdings in the Erie and Pere Marquette.

The earnings position of Chesapeake & Ohio prior to its acquisition by the Van Sweringens may be best indicated by its dividend record. The company paid dividends of 1 per cent annually from 1899 to October, 1908. In June, 1909, a 4 per cent rate was established which was maintained to the middle of 1910 when it was made 5, which rate was continued until June, 1914. In December, 1914, 1 per cent was paid, none in 1915, 2 per cent in 1916 and from 1917 to 1920, 4 per cent. In 1921 no payments were made for the second half year, but in 1922 the 4 per cent was reestablished and that rate was continued until 1925. Total payments in 1926 were 12 per cent inclusive of a 4 per cent special dividend and the regular rate is now 10 per cent. A dividend record of this kind (except for 1926 and 1927) would not be accepted as a guaranty of financial strength.

The road in its financing resorted to the use of convertible bonds, selling \$31,390,000 in 1910, convertible at par into common stock until February 1, 1920, but none of which were ever converted. On April 1, 1916, it sold another issue of \$40,180,000 some of which were converted into common stock in 1924 and 1925 and the remainder called on October 1, 1926. In 1922, improved prospects permitted the issue of \$12,558,500 6½ per cent cumulative preferred stock of a total authorized issue of \$30,000,000. This stock was convertible par for par into common stock and on December 31, 1926, only \$1,943,500 remained unconverted. The result of this financing and conversions has been substantially to increase the amount of common stock outstanding and thereby greatly improve the road's financial structure. The figures for selected years follow:

Date	Common	Preferred	Funded Debt	Per cent funded debt to total capitalization	Total
June 30, 1916	\$62,792,600	\$3,200	\$181,535,170	74	\$244,332,170
Dec. 31, 1921	62,792,600	3,200	202,838,700	76	265,636,000
1922	62,792,600	12,561,700	209,228,424	74	284,583,924
1923	65,425,725	12,561,700	212,316,124	73	290,304,749
1924	67,265,725	12,561,700	234,642,324	75	314,470,948
1925	90,702,281	12,100,700	213,860,524	68	316,653,705
1926	117,061,392	1,946,700	193,403,224	62	312,401,516

The amount of common stock has approximately doubled since 1922, whereas the funded debt has been reduced. At the end of 1921 the funded debt constituted 76 per cent of the total capitalization; at the end of 1926 only 62 per cent.

The increase in the amount of stock outstanding becomes particularly significant when the earnings per share on the common stock are given. Thus in 1922, as shown in Table I, after allowance for a full year's dividends on the 6½ per cent preferred stock, the per-share earnings on the common stock were \$9.09; in 1923 they totaled \$12.33 and in succeeding years were as follows: 1924, \$16.77; 1925, \$21.18 and in 1926, \$24.64. The true valuation of this improvement in earning power is best given by realization that the per-share earnings in 1926, \$24.64, were figured on approximately twice the amount of common stock outstanding as were the \$9.09 per-share earnings in 1922.

The issue of preferred stock in 1922 was intended to assist in the financing of the expansion program. The expenditures planned at the time totalled \$16,500,000 to be spread over four years. They included extension of terminal facilities at Hampton Roads, enlargement of

Table II.—Comparison of Selected Freight Operating Statistics

	1st 7 mos. 1927	1st 7 mos. 1923	Per cent of change Inc. Dec.
Mileage operated	2,658	2,553	4
Gross ton-miles (thousands)	22,359,872	13,832,224	62
Net ton-miles (thousands)	12,066,332	7,617,429	58
Freight train-miles (thousands)	8,359	5,964	40
Freight locomotive-miles (thousands)	9,368	6,679	40
Freight car-miles (thousands)	491,497	302,940	62
Freight train-hours	746,418	659,927	13
Tons of coal consumed by freight locos.	1,212,957	1,006,974	20
Car-miles per day	54.9	31.1	76
Net tons per loaded car	43.7	41.5	5
Per cent loaded to total car-miles	56.2	60.6	4.4
Net ton-miles per car day	1,348	783	72
Freight cars per train	59.8	51.8	15
Gross tons per train	2,675	2,319	15
Net tons per train	1,444	1,277	13
Train speed, miles per train-hour	11.2	9.0	25
Gross ton-miles per train-hour	29,956	20,960	43
Net ton-miles per train-hour	16,166	11,543	40
Lb. coal per 1,000 gross ton-miles	97	130	25
Loco-miles per loco-day	69.2	60.7	14
Per cent freight locos. unserviceable	13.8	17.6	4.2
Per cent freight cars unserviceable	3.1	9.3	6.2

shop and roundhouse facilities, additions to main line and passing tracks and grade revisions. It is note-

Table I.—Chesapeake & Ohio, Operating Results, Selected Items.

	YEAR ENDED JUNE 30, 1916, AND CALENDAR YEARS 1920 TO 1926							
	1916	1920	1921	1922	1923	1924	1925	1926
Average mileage operated	2,375	2,519	2,545	2,549	2,553	2,556	2,615	2,646
Total operating revenues	\$48,239,012	\$90,524,185	\$83,687,958	\$83,511,561	\$101,975,798	\$108,033,148	\$123,184,103	\$133,974,031
Total operating expenses	31,787,179	79,859,097	66,603,077	66,118,030	78,889,776	82,781,703	88,981,419	90,970,788
Net operating revenues	16,449,833	10,665,088	17,084,881	17,393,531	23,086,021	25,251,746	34,202,684	43,003,242
Railway tax accruals	1,587,407	2,997,720	2,682,160	3,301,201	4,687,394	4,628,463	6,776,290	8,240,412
Railway operating income	14,842,218	7,664,736	14,382,012	14,081,127	18,398,351	20,463,076	27,390,394	34,747,619
Equipment rents—Net Cr.	214,668	2,225,640	206,053	1,331,406	2,155,899	2,748,747	3,857,576	3,611,403
Net railway operating income	9,473,306	15,031,325	14,781,677	16,888,833	21,351,404	23,779,001	31,512,836	39,415,418
Gross income	15,031,325	15,031,325	14,781,677	16,888,833	21,351,404	23,779,001	31,512,836	39,415,418
Interest on funded debt	8,176,454	9,957,664	9,691,402	9,995,942	11,991,208	11,263,067	11,035,252	9,696,867
Net income	6,879,216	3,812,906	4,192,601	6,523,670	8,979,431	12,222,043	20,152,269	29,167,506
Preferred dividends	—	—	—	204,070	816,302	816,302	815,248	322,995
Common dividends—rate	—	—	—	—	—	—	—	12
Common dividends—amount	—	\$2,511,264	\$1,255,632	\$2,511,264	\$2,591,032	\$2,619,500	\$3,035,885	\$13,635,760
Earnings per share on common	\$10.95	\$6.07	\$6.68	\$9.09	\$12.33	\$16.77	\$21.18	\$24.64
Revenue ton-miles (thousands)	10,296,523	11,720,031	9,136,051	10,002,943	12,909,457	14,267,551	17,467,890	19,797,447
Revenue passenger miles (thousands)	281,349	384,045	331,513	304,221	334,583	312,427	280,510	264,544
Revenue per ton per mile (cents)	0.380	0.621	0.737	0.687	0.660	0.646	0.620	0.602
Tons of tidewater coal	8,098,537	4,935,676	3,636,854	4,965,367	4,858,005	7,935,490	11,231,792	11,231,792
Tons of revenue coal—eastbound	11,698,287	8,020,052	6,112,908	9,217,567	9,766,545	13,098,567	17,324,950	17,324,950
Tons of revenue coal—westbound	16,956,503	15,736,476	22,007,173	25,642,886	31,678,168	38,619,484	38,482,568	38,482,568
Tons of revenue coal carried	26,509,613	28,654,792	23,756,528	28,120,081	34,860,453	41,444,713	51,718,051	55,807,518
Total revenue tons	37,617,654	40,838,116	31,493,087	37,926,425	47,949,494	53,665,612	63,996,306	67,863,293
Per cent coal of total	70.48	70.17	75.33	74.15	72.70	77.23	80.81	82.24
Transportation ratio	28.6	42.0	37.6	35.7	33.1	30.7	28.2	27.2
Operating ratio	65.9	88.2	79.6	79.2	77.4	76.6	72.2	67.9
Per cent net railway operating income to total operating revenues	—	10.5	16.3	17.2	18.8	20.3	24.4	27.6

*After deducting the full rate of 6½ per cent on preferred series A stock; after allowing the actual amount paid, the earnings on common stock were \$10.06.

worthy that while the expenditures were made—as a matter of fact total expenditures for additions and betterments in the years 1922 to 1926 were about \$70,000,000 exclusive of 17 million spent for acquisition of new lines—the original plans were changed primarily because it was discovered that the westbound traffic was increasing beyond all reasonable expectations. The improvements at Hampton Roads have not yet been made nor are the general shops all that might be desired. However, great expansion has been made instead in the facilities necessary to handle westbound business.

In Table I are given figures showing the sudden expansion in Chesapeake & Ohio traffic and earnings following upon the growing difficulties of the union mines to the north and the ability of the Chesapeake & Ohio mines on account of their high grade coal, favorable freight rates and economical production costs to obtain markets formerly belonging to the union coal operators.

Increase in Coal Traffic

In 1926 coal constituted 82.24 per cent of all Chesapeake & Ohio revenue tons whereas in 1923 it had constituted only 72.70 per cent. A comparison as between 1926 and 1923 follows:

	1926	1923	Per cent of interest
Tons of tidewater coal.....	11,231,792	4,965,367	126
Tons of revenue coal—eastbound	17,324,950	9,217,567	88
Tons of revenue coal—westbound	38,482,568	25,642,886	50
Total revenue coal tons.....	55,807,518	34,860,453	60
Total revenue tons.....	67,863,293	47,949,494	41
Revenue ton-miles.....	19,797,447,000	12,909,457,000	53
Traffic density.....	7,481,180	5,057,178	48

The largest per cent of increase shown is for tidewater coal. This represented a special condition in 1926 due to the British coal strike. In 1923 the tonnage was reduced (from what it was, in say, 1920 when 8,000,000 tons were dumped at tidewater) because of the loss of foreign coal markets which American coal producers had cultivated immediately following the war. In 1926, so much tidewater coal was shipped that it was necessary to turn over several thousand cars for dumping at the Virginian's pier at Sewells Point and to ask mines jointly served by the Chesapeake & Ohio and the Virginian to ship if possible over the latter. The minority stockholders who are opposing the present merger plans have made much of this by pointing out that it shows that the new coal pier should have been built as proposed when the preferred stock was issued but the management has contended that it would have been fruitless to build new piers that would have been in use only when the special rush of shipments due to the British coal strike was on. The total Chesapeake & Ohio coal tonnage increased 60 per cent between 1923 and 1926 while the total revenue tonnage increased 41 per cent, and the revenue ton-miles 53 per cent.

Improvement in Operating Efficiency

The Chesapeake & Ohio has indicated improvement in its operating results commensurate with its increase in traffic and the capital expenditures made to meet its growing needs. Thus in 1926, its operating ratio was but 67.9 whereas in 1923 it was 77.4. In the same period the transportation ratio has been reduced from 33.1 in 1923 to but 27.3 in 1926. The ratio of net railway operating income to total operating revenues in 1923 was 18.8 but in 1926 it was 27.6 as compared with the country's average in that year of 19.1.

Table II will supplement this excellent record. It is a comparison of the operating statistics for the first seven months of 1927 with those of the same period of 1923. The record of increased operating efficiency is a remarkable one. Thus, the 62 per cent increase in gross ton-miles was handled with but 40 per cent increase in train-

miles, with but 13 per cent increase in train hours and but 20 per cent increase in coal consumption. The figure of 54.9 miles per car day, an increase of 76 per cent, stands out as does the increase of 43 per cent in gross ton-miles per freight train hour. The Chesapeake & Ohio seems to be doing particularly well in fuel consumption. Its 1927 seven months' figure of 97 lb. of coal per 1,000 gross ton miles was bettered in that period by but four roads, the largest of which was the Florida East Coast. It is all the more striking to find such economical coal consumption on a railroad serving coal fields where coal costs are made of secondary importance because of the nearness of the coal supply.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended October 1 amounted to 1,126,390 cars, a decrease of 53,659 cars as compared with the corresponding week of last year but an increase of 13,107 as compared with 1925. Grain and grain products showed an increase of 6,647 cars as compared with last year, but all other commodity classifications showed reductions, the largest being in the loading of ore and coal. All districts except the Pocahontas and Southern reported decreases as compared with 1926, but all except the Eastern and Central Western showed increases as compared with 1925. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

WEEK ENDED SATURDAY, OCTOBER 1, 1927

Districts	1927	1926	1925
Eastern	245,120	265,329	249,135
Allegheny	222,375	237,811	215,736
Pocahontas	64,016	60,342	57,537
Southern	169,465	168,250	167,114
Northwestern	172,312	183,598	167,304
Central Western	164,432	173,656	171,521
Southwestern	88,670	91,063	84,936
Total West. Dist.	425,414	448,317	423,761
Total All Roads	1,126,390	1,118,049	1,113,283
Commodities			
Grain and Grain Products.....	54,894	48,247	47,752
Live Stock	35,435	38,629	41,482
Coal	193,769	220,482	174,769
Coke	9,817	12,415	12,272
Forest Products	67,809	71,506	70,726
Ore	52,536	71,659	51,834
Mdse. L. C. L.	270,923	272,423	271,702
Miscellaneous	441,267	444,688	442,746
October 1, 1927	1,126,390	1,180,049	1,113,283
September 24	1,125,868	1,175,407	1,121,025
September 17	1,127,613	1,179,259	1,098,627
September 10	989,472	1,024,998	975,499
September 3	1,117,069	1,143,448	1,102,785
Cumulative total, 40 wks.....	39,997,894	40,314,189	39,006,227

The freight car surplus for the period ended September 30 average 135,059 cars, including 34,805 coal cars, 74,126 box cars, 14,026 stock cars and 4,933 refrigerator cars. For the period ended September 23 the surplus was 149,367 cars.

Car Loading in Canada

With the commencement of the grain movement in Western Canada, car loadings in the week ended October 1 showed a marked advance over the corresponding week of last year, and came very close to the record established in late October, 1926.

Loadings for the week were 82,431 cars, as compared with 77,331 in the corresponding week of 1926, and with

74,856 in the week immediately preceding. The gain was chiefly in loadings of grain, merchandise and miscellaneous freight.

	TOTALS FOR CANADA			CUMULATIVE TOTALS	
	Oct. 1	Sept. 24	Oct. 2	TO DATE	1926
<i>Commodities</i>	1927	1927	1926	1927	1926
Grain and Grain Products.	20,237	13,244	16,921	275,331	284,510
Live Stock	2,882	2,996	2,937	82,128	81,728
Coal	8,866	8,252	9,283	260,853	216,779
Coke	478	470	437	12,676	14,140
Lumber	3,808	3,919	3,893	148,486	142,919
Pulpwood	1,325	1,440	1,517	125,137	107,301
Pulp and Paper	2,325	2,152	2,166	86,150	93,203
Other Forest Products ...	3,002	2,915	3,132	118,943	120,931
Ore	2,020	2,200	2,079	65,310	67,279
Merchandise, L. C. L.	18,808	18,385	17,759	668,517	634,285
Miscellaneous	18,680	18,883	17,207	576,393	549,443
Total Cars Loaded	82,431	74,856	77,331	2,419,926	2,312,518
Total Cars Rec'd from Connections	38,541	37,913	38,454	1,471,262	1,454,806

Steam Heat Pressure Regulator

CONTINUALLY increasing the length of passenger trains has made it more difficult to heat thoroughly and uniformly all cars in a train, particularly the last one. It has been found that the 1½-in. by 2-in. regulator generally used is frequently overtaxed in cold weather with the result that regulation is destroyed and the excessive pressure admitted to the train line is liable to cause damage to the steam hose and other train heating equipment. In an effort



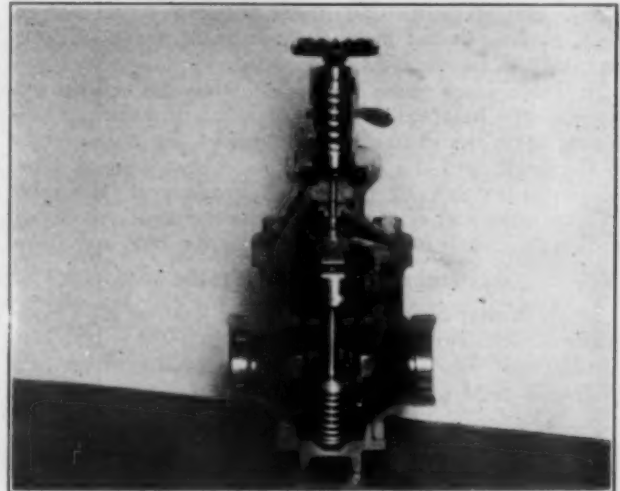
The Leslie 2-in. by 2-in. Steam Heat Regulator

to overcome this trouble, the Leslie Company, Lyndhurst, N. J., has redesigned its steam heat pressure regulators and increased the size from 1½ in. by 2 in. to 2 in. by 2 in. This regulator which is designated as Class AK, is designed to operate under pressures up to 300 lb. with superheated steam.

The features new to the valve are renewable control valve seat, main valve seat and cylinder liner. The control valve is made of special heat treated stainless steel and two piston rings instead of one are used in the new

type of valve. The characteristics of the metal used in the rings are hardness and elasticity. The other working parts are made of special heat and corrosion resistant metal.

The regulator is placed inside the cab in a vertical position on a horizontal pipe, at the highest point, with steam passing in the direction of the arrow cast on the



The Control Valve Seat, the Main Valve Seat and the Cylinder Liner Are Renewable

side of the regulator. The starting valve and the inlet pipe from the turret or boiler connection to the regulator must be of the same size as the inlet of the steam valve. The steam gage is installed on the outlet pipe from the regulator.

THE TRANS-CANADA LIMITED of the Canadian Pacific makes use of 96 cars; that is to say, for its run of 6,292 miles between Montreal and Vancouver, four trains westbound are always on the road; also four trains eastbound, and two are being turned at the termini, or ten trains in all. This non-stop summer train has just completed its 140 trips (each way) since May 15, and the season is called the most successful since the inauguration of the train, nine years ago. Sixteen train crews are required for a run across the continent besides 300 employees on sleeping and dining cars. The schedules of these trains are; westbound, 89 hours, 15 minutes; eastbound, 88 hours, 30 minutes.



International

A Crossing Warning for Highway Vehicles

Firemen Continue Testimony in Western Wage Arbitration

Labor saving devices and purchasing power, along with Chicago joint working agreement, occupy arbitration board's attention

SOME dozen improvements in the locomotive and its appurtenances have materially lightened the manual labor required of the fireman in the past 20 years, Donald B. Robertson, president of the Brotherhood of Locomotive Firemen and Enginemen, first witness for the employees in the application of firemen and hostlers for an increase in pay of approximately \$1 per day on Western railroads, admitted before a board of arbitration at Chicago on October 5 under cross examination by H. A. Scandrett, vice-president of the Union Pacific and counsel for the railroads. Direct and cross examination of the first employee witness was completed on October 7 after Mr. Robertson had been on the stand continuously for five days.

The direct testimony of Mr. Robertson during the week was largely occupied with the introduction of exhibits relating to the decrease in purchasing power of the fireman and the increased productivity of the locomotive. In this connection he called attention to the decrease in the number of locomotives in the Western district from 1921 to 1925, accompanied by an increase of 21 per cent in revenue tons per train and 31 per cent in tons carried one mile with a 20-year increase of 135 per cent in tons carried one mile. One exhibit was introduced to show that the decrease of 5 per cent in the costs of locomotive operation, other than wages, would pay for an increase of 33 per cent in compensation to firemen and hostlers. With a purchasing power of \$3.66 in 1907, using 1913 as par, the present wage rate produces for the fireman in 1926 a purchasing power of \$3.27, which is 10 per cent less than 20 years ago, Mr. Robertson said. The wage rate necessary for an increase proportionate to the increase in union wages would be \$8.37 instead of the \$6.73 asked and the wage rate necessary for firemen's wages to equal average union wages would be \$9.18.

Manual Labor Has Decreased

Mr. Scandrett, in obtaining from Mr. Robertson the admission concerning the decrease in the manual labor of the fireman, called attention in detail to the mechanical stoker, the mechanical grate shaker, the automatic bell ringer, the electric head and engine lights, the coal pusher, the sloping sides of the coal tank, the decrease in leaky flues, the superheater, the brick arch, the automatic fire door and the oil burner. Counsel for the carriers called attention to the fact that firemen formerly kept the locomotive clean above the running board and inside the cab, a requirement that has been gradually eliminated until today practically the entire work of keeping the locomotive clean devolves upon the round-house forces. Mr. Robertson testified to the truth of this statement.

While Mr. Robertson admitted that the booster has increased the earnings of the fireman by placing his wage rate in a higher tractive power classification with

little extra labor on his part, through its use largely on stoker-fired locomotives, he testified that the booster has the effect of reducing the ruling grades, enabling a locomotive to haul a maximum tonnage over an entire division and thereby adding to the responsibility of the fireman. Closer attention is required to fuel a booster tonnage train properly, he said, and the general effect of labor-saving devices has been to divert the energies of the fireman from manual duties to new duties such as reading an increased number of signals.

Further inquiry of Mr. Robertson was made by Mr. Scandrett on the subject of the Chicago joint working agreement and it developed during the examination that the abrogation of this contract between the Brotherhood of Locomotive Firemen and Enginemen and the Brotherhood of Locomotive Engineers became effective on October 1. Inclusion of its terms in existing wage schedules will preserve the agreement in company-employee contracts, Mr. Robertson said. Mr. Scandrett pointed out the provisions of this agreement which act to keep the fireman from totaling more than 3,800 miles in one month in freight pool service and 4,800 miles in passenger pool service. The number of men in the pool might be reduced, he said, but for the agreement, enabling those remaining to increase their earnings each month. The employee witness replied that the agreement acted to stabilize employment by distributing a higher average of earnings to a larger group of firemen.

Yard firemen work on an average of 56 hours per week, while freight firemen work more than eight hours per day for 30 days or a minimum of 2,400 miles and passenger firemen, though actually covering more miles in a month, average a lower number of hours, testified Mr. Robertson. Yard work is usually considered the least desirable service, he said, with through freight, local freight and passenger service ranking above in the relative order of earnings.

In comparing the ratio of actual to expected deaths in various occupations, Mr. Robertson testified earlier in the week that firing a locomotive is the fifth most hazardous occupation in the United States. Enginemen and trainmen, he said, have an average age at death of 37.4 years, according to figures prepared by the United States Bureau of Labor Statistics. The only other group of employees that has a lower average age at death is the group of indoor workers, bookkeepers and office assistants, 36.5 years, he said. Life insurance rates for firemen in the "old line" companies are as a rule \$5 per thousand more than the rates for the ordinary preferred risk.

Expenses Away from Home

Expenses incurred by firemen in road service while away from home average about 12.5 per cent of their total earnings, Mr. Robertson said. In a table of the earnings of the highest paid firemen he called attention

to the fact that all were men who had performed the equivalent of from 14 to 18 months of normal work in one year in order to obtain these amounts.

Exhibits were introduced by the employees to show that if the fireman's wage had increased in the same ratio as his productivity in the past 20 years, 34.5 per cent, his daily wage rate would now be \$8.30 instead of \$5.73. From 1920 to 1924, it was shown, the daily wage rates of firemen suffered a decrease varying from 24 to 32 cents.

The employees placed J. A. Ford, general chairman of the Brotherhood for the Pacific system of the Southern Pacific, on the stand as their second witness, on October 7. In direct examination Mr. Ford testified that 261 firemen or about 10 per cent of the total number employed by the Pacific lines of the S.P. in November, 1926, were affected by the higher mountain differential rates, involving about 11 per cent of the mileage. Between Roseville, Cal., and Truckee on the S.P. the standard wage rate on oil-burning locomotives is 4 cents higher than on coal burning locomotives, brought about through the existence of a large number of tunnels and snowsheds, Mr. Ford said under cross examination by Mr. Scandrett. He added that although the distance between those two points is 101 miles the men are allowed 121 miles, including constructive mileage, which with the mountain differential places the wage for locomotives with a weight on drivers between 170,000 and 200,000 lb., \$1.38 higher than the standard rate.

Basil M. Manly, an economist of Washington, D. C., offered an exhibit entitled "The Purchasing Power of a Fireman's Wage" to show that the absolute necessities of life for the fireman, considering the manual labor involved in his occupation, cost \$1,750.10 per year. In this exhibit Mr. Manly assumed a basic wage of \$1,800. Among the items in his budget were \$721.10 for food, \$420 for rent and \$200 for "away from home" expenses.

Brotherhood Calls Employee Witnesses

On October 10 the Brotherhood called upon a number of firemen who are now in service on Western railroads to place before the board of arbitration a picture of their working conditions. The testimony of G. M. Hall, a promoted engineman on the Gulf, Colorado & Santa Fe, who is now working as a fireman as a result of a decrease in business on that railroad, was declared by the employees to be typical of the work performed by firemen on oil burning locomotives. Mr. Hall testified that he now operates in passenger service on a run between Cleburne, Tex., and Belleville Yard, 212 miles, losing on his trips one day in each five days. On the runs between these two points Mr. Hall keeps the steam pressure up, watches the water level, reads block and interlocking signals, watches for traffic at 156 grade crossings and keeps the oil at the proper temperature in the tender tank. His earnings in 1926, including \$650 earned as engineman, amounted to \$2,676.50. In July, 1914, there were 15 men ahead of him on the seniority list and at the present time there are 16. Although the physical labor on a coal-burner is greater than on an oil burner the oil-burner requires much closer supervision, said Mr. Hall.

W. A. Larson, fireman in passenger service on the Yazoo & Mississippi Valley, testified that his earnings since January 1 were at the rate of \$214 per month in coal-burning service, during which period he has been absent from his regular run only twice. Once he had exceeded his mileage under the Chicago joint working agreement while in several other months his mileage had been exceeded though he had not been forced to abandon his work.

Looking Backward

Fifty Years Ago

Through its annual report for the year ending September 1, 1877, the Northern Pacific has demonstrated that the continent along the line of the forty-seventh and forty-eighth parallel is not the sterile, ice-bound waste that geographers and travellers formerly pictured.—*Railway Age*, October 18, 1877.

A report recently issued by the Michigan railroad commissioner shows that of the 36 railways in that state 30 failed in 1876 to earn enough to pay expenses and interest, while only four companies paid their stockholders a penny on the investment. The Lake Shore & Michigan Southern received in that year 6.12 mills per ton mile for transporting through freight.—*Railway Age*, October 18, 1877.

The vice-president and general superintendent of the Mobile & Montgomery (now part of the Louisville & Nashville) has arranged an ingenious device for protecting his trainmen on freight trains from "low bridges." It consists of an arm projecting across the track from which are suspended a number of ropes in such a manner as to strike the trainman and warn him that the train is nearing a bridge.—*Railway Age*, October 18, 1877.

Twenty-Five Years Ago

The recurring annual shortage of railway equipment is marked this year by the unusual shortages of motive power. The blockade this year differs from former blockades in that the accumulations of cars are chiefly at or near the initial points instead of at delivery points.—*Railway Age*, October 17, 1902.

The Grand Trunk has opened a new six-story office building in Montreal which represents such an advance in convenience, comfort and healthfulness that the assistant to the second vice-president estimates that the new building has increased the working efficiency of the force employed there by 10 per cent.—*Railway Age*, October 17, 1902.

While the Norfolk & Western is petitioning the governors of Virginia and North Carolina to allow the running of coal trains on Sunday to relieve the bituminous coal famine at delivery points on its line, the Seaboard Air Line and the Atlantic Coast Line are changing locomotives from coal to wood burning because of the inability to obtain an adequate supply of bituminous coal. All engines on the Carolina Central division of the S. A. L. will be converted into wood burners.—*Railroad Gazette*, October 17, 1902.

Ten Years Ago

The Erie, to insure that diffident employees shall not be buried under their own modesty, has invited them to write letters to their superintendent, telling him what higher positions they feel qualified to fill.—*Railway Age Gazette*, October 12, 1917.

Persons who criticize the railways for charging full fares to soldiers and sailors, asking that transportation be given away as the Y. M. C. A. distributes magazines, should be satisfied with the announcement that the Long Island will carry uniformed men between Camp Upton, N. Y., and New York, 63 miles, at a rate of less than one-half cent a mile.—*Railway Age Gazette*, October 12, 1917.

A dozen railroads have announced company subscriptions to the Second Issue of the Liberty Loan totaling \$42,250,000. Among the large subscribers are the Santa Fe, the Burlington, the Norfolk & Western, the Northern Pacific, the Southern Pacific, the Union Pacific and the Pennsylvania which took \$5,000,000 of bonds each and the Lackawanna which took \$4,000,000 worth.—*Railway Age Gazette*, October 12, 1917.

Communications and Books

Signals Will Not Protect Track Motor Cars

TO THE EDITOR:

In your issue of August 27, page 389, William Nichols discusses the safe operation of track cars. The next to the last paragraph in his letter reads as follows:

"If we are really honest in our desire to safeguard these movements of track cars, let us remove the insulation from the wheels, so that block signals may function properly when a motor car is in the block; and require these men to live up to rules governing the handling of such cars."

If doing what Mr. Nichols suggests would allow the automatic block signals to function properly this would be an easy way to insure the safe operation of track cars in automatic block territory.

However, these hand, motor, truck and velocipede cars will not consistently shunt the track circuit with the result that conditions might be made worse; i.e. false clear signals would result at times, producing false security on the part of those riding the track cars with the result that they might be caught unawares, thus defeating the purpose of the arrangement.

Trouble is encountered in securing consistent shunting of track circuits when cars much heavier than the cars in question are used. I have in mind gas-electric or other similar cars which are being used in miscellaneous light service to replace steam trains, a more or less common practice these days. The trouble is, of course, worse where the tracks are used infrequently and where the rails are not very well polished as a result.

As a whole, to depend upon automatic block signals the vehicles used must, without failure, operate track circuits. This the track cars in question will not do.

B. J. SCHWENDT,
Assistant Signal Engineer, New York Central Lines West.

Protecting Track Motor Cars

TO THE EDITOR:

To my mind, the thought conveyed in the editorial in the *Railway Age* of July 30, entitled: "Dispatcher's Responsibility for Track Motor Cars," is contrary to the requirements of all operating, maintenance of way and safety rules pertaining to the operating of motor cars. Under our rules, maintenance of way foremen are required to have a standard watch, required to have the current time table in their possession while on duty, and when working out of a station with an open telegraph office are required to get a line-up on trains. These three requirements are for the express, and, I might say, the sole purpose of enabling the foreman so to plan his work, which work includes the movement of the gang and material over the main track, as not to delay scheduled trains and trains indicated on the line-up. To my mind, safety in operating a motor car, safety in trucking material, safety in performing track or bridge work, is in no way involved in these three requirements, as the foreman operating the motor car, trucking material, or performing work on the track, must at all times on single track expect a train from either direction. If conditions are such that he is not ready or cannot get his car into the clear or make the track ready between the time that the train comes into view and the time of reaching the point of possible obstruction, the movement of the motor car must be made, or the work carried out, under the protection of a flag.

The dispatcher should, of course, furnish the foreman with accurate information. In other words, the line-up should be accurate and complete; this, however, for the purpose of enabling the foreman to make his plans for the day's work, this including

the movement of the gang and material over the main track, so as to cause minimum delay to trains.

R. C. WHITE,
Assistant General Manager, Missouri Pacific.

Humping 8,000 Cars a Day

UTRECHT, Holland.

TO THE EDITOR:

In the *Railway Age* of June 4, you published a description of the methods by which the Belt Railway of Chicago classifies a heavy traffic at Clearing, Ill. In comparison, I should like to give you some records made in the hump yard at Hamm, Germany. This yard, as at Clearing, has separate adjacent humping facilities for each direction of traffic. While 3,815 cars were humped in Clearing yard on March 23, 8,255 cars were humped in the Hamm yard on March 28. In 10 hr. 14 min., 3,711 cars were humped over one lead at Hamm.

Where at Clearing a car went down the hump every 31 sec., the average time of splitting up a train of 50 cars at Hamm was only 8 min. 7 sec. On the second hump lead at Hamm and on the same day, 1,896 cars were humped in 8 hr. 2 min., and on the third hump lead 2,648 cars in 12 hr.

The 3,711 cars handled over one hump were pulled down by only one locomotive, which did all the other work on that side on the classification tracks. The classification yard is equipped with four Thyssen-Huebbe car retarders.

W. SIMON-THOMAS,
Divisional Traffic Manager, Dutch Railways.

[While the above record indicates a remarkable performance, it should be remembered, for purposes of comparison, that cars used on the German railways are by no means as large as the cars here.—EDITOR.]

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Extracts from the Acts of the Third General Conference on Communications and Transit Held at Geneva, August 23rd—September 2, 1927. In two parts, the first listing the official and advisory delegations and the second giving the agenda and results of the conference which considered the advisability of an organization for the collection of information on communication and transportation on an international scale. 40 p. Published by the League of Nations, Geneva, Switzerland. Available in this country from World Peace Foundation, Boston, Mass.

Revised Index Numbers of Wholesale Prices 1923 to July, 1927, by U. S. Bureau of Labor Statistics. Its Bulletin No. 453. 31 p. Pub. by U. S. Govt. Print Off., Washington, D. C., 10 cents.

The Weather Bureau as a Factor in the Operation of Railroads and Lines of Communication, by Dr. H. C. Frankenfield. History of the Weather Bureau, its methods of obtaining data and important co-operation by railroads. 12 p. Pub. by Telegraph and Telephone Section, American Railway Association, New York City.

Periodical Articles

The Management of Railway Shops and Terminals, by William R. Harrison. The master mechanic, Kansas City and Eastern divisions, Santa Fe, has written a paper on the why of shops and terminals, their organization and personnel that should interest non-railroaders as well as railroaders. *Mechanical Engineering*, October, 1927, p. 1120-1124.

Odds and Ends of Railroading

According to a dispatch to a London paper, the head of an Australian railway policemen's union has been taken severely to task by the leader of another railway union for not instilling "the principles of unionism" into his members. The sleuths have evidently so forgotten their union loyalty as to arrest pilferers among railway employees who were members in good standing of another union. For shame!

A unique method of soliciting business was adopted recently by C. N. Rogers, of the Chicago, Burlington & Quincy. Just before Col. Charles A. Lindbergh was billed to appear in Denver, Colo., Mr. Rogers drove about the surrounding country in an automobile carrying the following sign: "All those planning to see Lindy in Denver August 31 please register here. Everyone invited—See America's hero in person." More than 1,400 people registered and to all of these Mr. Rogers explained the advantages of using the Burlington in their trip to Denver to see the flying colonel.

John Frederick Brinkley is the son of one locomotive engineer on the Frisco and the grandson of another, so perhaps it is natural that railroading should be in his blood. John is still a bit young to do any real railroading, but he has two rooms fitted up at his home until they resemble a Frisco yard. He has electric locomotives and a passenger and a freight train, the cars in the passenger train being electrically lighted. Hour after hour he sits at a miniature keyboard, putting down the crossing gates, ringing the bell and putting the freight train in a siding while he gives the passenger train the clear order. It would seem that the Frisco will have the services of another engineer, 15 or 20 years from now.

Model Making in New Zealand

Model-making among railway men does not seem to be confined to this country. The New Zealand Railways Magazine reports an interesting model railway, constructed by F. Roberts, of Epsom, N. Z., a retired engine-driver of the New Zealand Railways. The model railway runs around the garden, with a station in the house entered by means of a tunnel. The rolling stock consists of an engine, a coach, a caboose, a refrigerator car and several box cars. The coach and the caboose are equipped with electric lights. The gage of the diminutive railway is only 2½ in., yet the locomotive is equipped with valve gear and an air brake. This is worked by means of a pump operated from the motion on the right hand side of the engine. As the pump is, of course, very much out of scale, it is necessary to conceal it in one of the side tanks. These builders of model railways should really form an international association for exchange of views as to the best methods of construction. The industry is widespread and apparently growing.

A Local Public Relations Problem

The president of a small bank and his family in a town which is almost totally dependent on a railroad terminal for its existence recently took a several thousand mile sightseeing trip in his automobile. For shelter he took along a tent. Returning, he was reported in a local paper as saying that the entire trip had cost him only \$250, which was "about one-fourth what it would have cost by rail," with Pullman fare, hotel bills and other expenses included. If the gentleman's figures are correct, which we are inclined to doubt, no one can find fault with him for making his outing a cheap one, if cheap travel is the kind he enjoys. On the other hand, is it not rubbing it in a bit for the president of a bank not only to fail to patronize his customers, but in addition to come out in print telling how, comparatively, unattractive their services are? We wonder how the gentleman would feel if the railroad and its employees should discontinue depositing money in his bank and, more than that, should publish statements of a nature to discourage others

from doing business with him. Of course they would do no such thing, but are not the two cases exactly parallel?

The Fair Sex at the Fair

It was at the Baltimore & Ohio's centenary pageant. A lady old enough to remember locomotives some decades back kept exclaiming as each one of the old "iron horses" passed, "Oh! I remember when they used to run engines like that." She was not paying any attention to her program nor to the announcer. Suddenly the character of the pageant changed and a modern locomotive appeared. It was the British "King George V." "Well," she gasped, "I can remember back a good long time but I never saw one look like that before." Her bewilderment was of a piece with that of the yokel who, upon first seeing a giraffe, gulped and said, "There ain't no such animal."

Another lady did not like the appearance of a locomotive "with a blanket all rolled up on it." Inquiry proved that she referred to the feed-water reservoir perched on the smoke-box.

A Friendless Railroad

Some railroads in applying to the Interstate Commerce Commission for authority to abandon a piece of line are required to go into considerable detail, in replying to the commission's questionnaire, to show that the removal of the track or the discontinuance of operation will not unduly inconvenience what public there may be to be affected. However, the Tonopah & Goldfield, which has asked for a certificate to abandon 6.75 miles of its line in Nevada, was able to state this part of its case very concisely. "This track," it says, "has not been used for operating purposes for the past ten years and is not going to be of any use in the future. Said 6.75 miles of track was originally constructed to handle freight business from Goldfield to Mina in the boom days of Goldfield. That business no longer exists and trains operate from Goldfield via Tonopah to Mina. No person is interested in said 6.75 miles of track or its removal."

The commission has not yet announced whether hearings will be required before it places the stamp of its official approval on the removal of these friendless rails and ties before they become a part of the Nevada desert.

A New 8 A. M. Report

A superintendent's chief clerk on the Missouri-Kansas-Texas is responsible for this fancy:

"One of these days our 8 a.m. report will read like this:

"Cloudy, high southerly winds, velocity 40 miles per hour, seriously retarded movement northward planes.

"Passenger special north, airplane 2001, developed motor trouble at altitude of 19,000 ft. over Vici. Engineer, in attempting to replace defective spark plug, slipped off, due to defective handhold, and when last seen was falling in direction of Woodward. His parachute apparently working O.K.

"No. 403, airplane 2002, Pilot Dellis, ran into squall at an altitude of 4,500 ft. over Altus. Elevator control cable snapped, causing machine to go into loop, and three revenue and 28 dead-head passengers fell out. Undertakers now busy picking up remains, using the blotter system. Pilot Dellis finally got machine under control and landed safely. Pilot not injured. No other casualties account all passengers lost in loop.

"No. 83, airplane 2003, in dropping a piano consigned to Altus, used wrong sized chute and further failed to consider wind velocity, with result piano hit court house instead of station platform, badly damaging piano, and generally shaking up court that was in session.

"No. 404, airplane 2004, in dropping off two passengers at Mangum, man and wife, both insisted being dispatched with separate parachutes, wife landed in our water reservoir at Mangum, husband manipulated his chute and went on to Hester. Claim agent on ground."

NEWS of the WEEK



THE INTERSTATE COMMERCE COMMISSION has allowed an extension of time in which to answer its questionnaire relating to installations of automatic train control to the New York Central and the Erie and affiliated lines.

THE SUPREME COURT OF THE UNITED STATES has allowed the motion of the solicitor general to advance, for hearing on November 21, the appeal from the decision of the lower court enjoining the enforcement of the Interstate Commerce Commission's valuation order in the Kansas City Southern case.

OVER 680 PENSIONED EMPLOYEES of the Chicago, Rock Island & Pacific with members of their families were guests at a luncheon given by the road at Chicago on October 10, at which addresses were made by J. E. Gorman, president, Carl Nyquist, vice-president, L. C. Fritch, vice-president, and Friend C. Barber, a pensioned engineman.

OF 134 HIGHWAY CROSSINGS on the Long Island recently inspected by the engineers of the New York State Transit Commission, all equipped with gates, 76 have no automatic warning bell to inform the attendant of the approach of a train, though some of them have bells which are operated by a watchman at another crossing. Wm. C. Lancaster, chief engineer of the commission, has made a report recommending the installation of automatic bells at all of these crossings, the cost of which he estimates at about \$250,000.

THE HEARING of the test case brought by the St. Louis & O'Fallon and the Manufacturers' Railway against the Interstate Commerce Commission opened at Kansas City, Mo., on October 5. On October 1 Federal Judge C. B. Faris of St. Louis, Mo., granted the National Conference on valuation of American railroads permission to intervene in the hearing. Besides Judge Faris, the other two magistrates involved in the hearing are Federal Circuit Judges Stone and Van.

Red Cross Roll Call

E. E. Loomis, president of the Lehigh Valley, is chairman, for New York City,

of the committee for soliciting contributions from railroads for the Red Cross roll call for the present year; and H. K. Brooks, vice-president of the American Express Company, is chairman of a similar committee to attend to the express field. The roll call will be begun on Armistice Day.

Exhibits at Telegraph Convention

At the annual convention of the Telegraph & Telephone Section of the American Railway Association at Washington last week, Mudge & Company, Chicago, exhibited its "center-light" track car, a gasoline motor car weighing less than 400 pounds; and Leonard S. Miller, Cincinnati, exhibited the Miller-Kuprox all-metal rectifier, as arranged especially for telephone ringing.

New York Railroad Club

The program for the Purchases and Stores Night of the New York Railroad Club, which will be observed on Friday evening, October 21, has been somewhat modified from the announcement made in the *Railway Age* of October 8, page 695. C. E. Walsh, purchasing agent of the Pennsylvania Railroad, will speak on the problems of the purchasing department, and A. L. Sorensen, manager of stores, Erie Railroad, will speak on the problems of the stores department.

Attendance at B. & O. Centenary Tops 1,000,000

Attendance at the Baltimore & Ohio's centenary exposition and pageant, on October 12, reached a total of 962,000 with the expectation that on October 13 it would approach the million mark, exceeding this considerably by the closing date, October 15.

The high mark in attendance for a single day, 76,000 on October 1, was exceeded on October 11, when over 80,000 persons visited the exhibition grounds.

The pageant during the final week is being shown twice daily, the last performance being scheduled for 2:30 p. m. on

October 15. After this date, for a limited time, the grounds will be kept open to allow visitors to see the exhibits.

Hearings on Accounting Classifications and Depreciation

The Interstate Commerce Commission has decided to make the revision of the accounting classifications the subject of a public hearing and also to hold such hearings in connection with the further hearings on depreciation charges. The date has been set as November 9 and it is the commission's plan to keep the records separate, but with the understanding that it may prove desirable to consider the records together. Various requests have been received for a public hearing relative to the classifications and the commission has been advised that the National Industrial Traffic League is prepared to present a revision involving a marked departure from the system of accounting which is now followed. It has also been represented that there is such interrelation between the general revision of the accounting rules and the matter of depreciation charges that the two subjects should be considered together or at least in close proximity.

Speakers at R. B. A. Annual Meeting

Speakers at the annual meeting of the Railway Business Association, to be held at the Hotel Commodore, New York, on November 16, will include:

At the morning session: Virgil Jordan, chief of research, National Industrial Conference Board, who will discuss the subject, "Are Business Booms Extinct?" (in a forum on the general subject, "Future Traffic Growth and Railway Facility Requirements").

At the dinner: Fred W. Sargent, president, Chicago & Northwestern; United States Senator Hiram Bingham of Connecticut, speaking on the Far East, especially China and the Philippines, where he recently spent six months, and Neal O'Hara, humorist, who insists "This Is a Great Country."

President Alba B. Johnson announces
(Continued on page 744)

Revenues and Expenses of Railways

MONTH OF AUGUST AND EIGHT MONTHS OF CALENDAR YEAR 1927

Name of road	Average mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Net operating income	Net operating income, 1926
		Freight	Passenger	Total	(inc. misc.)	Way and structures	Maintenance of equipment	Traffic	Portation	General	Total		
Akron, Canton & Youngstown.....Aug. 171	171	\$274,499	\$437	\$285,689	\$45,189	\$27,073	\$27,073	\$11,163	\$76,327	\$12,799	\$172,455	\$105,370	\$59,180
Akron, Canton & Youngstown.....8 mos. 171	171	2,074,533	2,716	2,162,434	236,081	236,081	236,081	90,978	614,155	118,153	1,402,636	627,592	775,044
Archison, Topeka & Santa Fe.....Aug. 9,449	9,449	13,209,894	3,309,308	18,005,420	3,433,442	3,433,442	3,433,442	347,121	4,921,921	12,089,729	12,089,729	4,304,455	6,866,677
Archison, Topeka & Santa Fe.....8 mos. 9,417	9,417	94,773,057	26,782,902	121,712,113	23,262,981	26,762,237	26,762,237	3,217,342	39,750,251	3,188,021	95,288,989	26,026,914	30,123,937
Gulf, Colorado & Santa Fe.....Aug. 1,944	1,944	2,258,816	252,252	2,638,181	453,751	519,783	519,783	51,546	827,912	66,137	1,888,810	664,352	1,224,458
Gulf, Colorado & Santa Fe.....8 mos. 1,944	1,944	19,870,217	1,863,176	22,771,737	4,830,122	4,830,122	4,830,122	434,040	7,580,702	562,725	17,706,160	4,391,027	2,915,133
Panhandle & Santa Fe.....Aug. 954	954	866,886	121,062	1,077,385	170,085	224,347	224,347	8,960	338,177	27,159	642,876	376,945	265,931
Panhandle & Santa Fe.....8 mos. 954	954	8,439,571	1,057,506	10,138,068	1,668,916	2,168,494	2,168,494	91,033	3,486,448	218,170	7,338,505	2,461,236	2,877,269
Atlanta & West Point.....Aug. 93	93	189,632	65,108	289,038	30,753	46,660	46,660	10,680	93,313	12,998	197,760	74,053	59,954
Atlanta & West Point.....8 mos. 93	93	1,341,264	492,264	2,033,389	238,377	362,821	362,821	93,180	771,790	111,306	1,614,980	343,885	271,095
Western of Alabama.....Aug. 133	133	184,407	59,101	264,196	28,187	47,700	47,700	11,084	90,448	12,601	193,497	51,990	54,873
Western of Alabama.....8 mos. 133	133	1,406,279	456,761	2,056,747	290,422	420,856	420,856	97,282	666,727	105,426	1,614,294	327,175	455,511
Atlanta, Birmingham & Coast.....Aug. 639	639	346,258	44,050	434,016	98,687	76,520	76,520	27,250	157,191	17,331	387,924	31,888	16,807
Atlanta, Birmingham & Coast.....8 mos. 639	639	2,912,359	282,078	3,520,622	849,845	673,654	673,654	225,226	1,364,593	146,344	3,350,347	55,502	106,286
Atlantic Coast Line.....Aug. 5,096	5,096	3,819,338	925,450	5,206,790	1,028,241	1,350,354	1,350,354	156,855	2,192,303	176,749	4,935,354	1,800,827	1,513,775
Atlantic Coast Line.....8 mos. 5,068	5,068	40,509,891	11,003,532	55,937,081	8,601,198	11,289,249	11,289,249	1,284,395	20,345,570	1,434,732	43,738,763	8,573,350	12,838,895
Charleston & Western Carolina.....Aug. 342	342	255,431	18,599	283,169	38,571	46,619	46,619	7,527	108,356	6,954	208,027	57,535	26,578
Charleston & Western Carolina.....8 mos. 342	342	2,199,488	133,248	2,423,490	526,514	354,626	354,626	58,671	918,271	55,196	1,913,272	347,091	309,045
Baltimore & Ohio.....Aug. 5,642	5,642	18,385,620	2,285,928	22,104,324	2,500,004	4,323,068	4,323,068	481,282	7,382,045	808,946	15,641,237	5,438,777	5,177,151
Baltimore & Ohio.....8 mos. 5,641	5,641	138,049,843	17,454,746	165,818,399	19,861,865	35,546,532	35,546,532	3,771,901	58,283,903	5,392,945	124,343,477	33,289,696	31,419,156
Baltimore & Ohio Chicago Term.....Aug. 75	75	.....	357,039	357,039	40,559	32,705	32,705	2,452	162,864	16,714	261,999	34,416	113,834
Baltimore & Ohio Chicago Term.....8 mos. 75	75	.....	2,600,295	2,600,295	330,481	312,764	312,764	18,577	1,315,058	129,247	2,144,493	24,118	745,227
Staten Island Rapid Transit.....Aug. 23	23	.....	147,953	147,953	33,860	20,479	20,479	1,892	118,189	15,282	189,702	104,319	45,053
Staten Island Rapid Transit.....8 mos. 23	23	.....	1,033,314	1,033,314	218,187	320,600	320,600	16,307	891,286	124,049	1,517,805	509,013	203,732
Bangor & Arrostook.....Aug. 613	613	288,694	45,749	363,336	97,713	101,539	101,539	5,636	104,632	25,473	339,066	33,738	29,551
Bangor & Arrostook.....8 mos. 613	613	4,235,505	485,864	4,934,720	852,908	932,342	932,342	46,462	2,609,885	194,176	3,312,924	1,226,893	1,085,345
Belt Ry. Co. of Chicago.....Aug. 32	32	.....	61,371	61,371	61,371	61,371	61,371	3,272	269,200	9,602	407,054	221,985	160,772
Belt Ry. Co. of Chicago.....8 mos. 32	32	.....	4,917,572	4,917,572	434,422	500,492	500,492	26,089	2,180,248	78,853	3,222,104	1,313,066	1,329,335
Bessemer & Lake Erie.....Aug. 227	227	1,472,776	12,483	1,505,319	88,666	336,347	336,347	16,478	353,565	31,544	832,037	557,197	574,063
Bessemer & Lake Erie.....8 mos. 227	227	8,961,038	98,542	9,229,122	904,259	2,578,183	2,578,183	119,265	2,606,920	278,860	6,446,838	2,294,748	3,864,294
Hingham & Garfield.....Aug. 33	33	40,635	.....	40,635	41,759	13,719	13,719	1,163	10,959	5,414	40,668	1,091	10,629
Hingham & Garfield.....8 mos. 33	33	327,277	.....	327,277	36,578	68,582	68,582	11,279	80,854	40,495	280,426	813	130,079
Hoston & Maine.....Aug. 2,113	2,113	4,261,625	1,849,407	6,935,586	1,164,418	1,212,424	1,212,424	85,679	2,402,594	201,795	5,087,023	1,551,804	1,324,647
Hoston & Maine.....8 mos. 2,111	2,111	33,008,380	12,498,985	51,324,069	6,934,340	9,849,352	9,849,352	639,442	19,434,281	1,743,779	39,095,669	10,040,876	8,853,698
Brooklyn Eastern Dist. Term.....Aug. 9	9	.....	115,687	115,687	12,881	10,689	10,689	4,862	365,869	49,897	608,590	42,791	46,582
Brooklyn Eastern Dist. Term.....8 mos. 9	9	.....	969,820	969,820	81,073	106,689	106,689	4,862	365,869	49,897	608,590	305,740	349,073
Buffalo & Susquehanna.....Aug. 253	253	124,154	1,441	130,944	29,302	52,586	52,586	1,625	40,906	7,245	131,664	2,820	5,768
Buffalo & Susquehanna.....8 mos. 253	253	983,956	14,796	1,401,106	227,054	409,001	409,001	13,652	344,925	63,430	1,038,012	33,706	102,515
Buffalo, Rochester & Pittsburgh.....Aug. 601	601	1,348,848	105,435	1,511,916	272,032	481,866	481,866	29,285	553,758	45,750	1,385,530	76,385	126,742
Buffalo, Rochester & Pittsburgh.....8 mos. 601	601	10,587,968	748,891	11,750,778	1,422,043	3,833,625	3,833,625	235,901	4,917,738	366,376	10,369,680	980,677	1,101,679
Canadian Pacific Lines in Maine.....Aug. 233	233	77,402	30,925	120,756	44,251	33,284	33,284	6,240	64,033	3,696	151,504	15,008	45,438
Canadian Pacific Lines in Maine.....8 mos. 233	233	1,407,222	256,760	1,767,775	428,701	370,065	370,065	45,938	791,411	30,268	1,666,383	101,392	137,496
Canadian Pacific Lines in Vermont.....Aug. 85	85	110,155	294,116	192,599	22,541	27,886	27,886	2,476	94,334	2,090	149,327	38,522	39,334
Canadian Pacific Lines in Vermont.....8 mos. 85	85	900,408	294,116	1,383,708	213,006	249,983	249,983	18,143	809,333	21,336	1,311,801	71,907	30,315
Central of Georgia.....Aug. 1,911	1,911	1,737,120	375,137	2,271,896	308,042	375,319	375,319	65,638	812,378	94,941	1,666,117	462,168	473,388
Central of Georgia.....8 mos. 1,911	1,911	13,812,515	3,093,281	18,527,283	2,348,308	3,332,106	3,332,106	604,728	6,995,564	820,017	14,186,733	3,342,580	3,208,247
Central of New Jersey.....Aug. 690	690	4,154,993	1,003,160	5,505,253	419,971	1,088,231	1,088,231	47,897	1,877,111	112,309	3,569,675	1,457,977	1,392,113
Central of New Jersey.....8 mos. 690	690	30,547,846	6,179,011	39,209,812	3,745,518	8,491,367	8,491,367	380,547	15,416,601	945,246	29,176,763	7,707,235	6,757,662
Central Vermont.....Aug. 433	433	617,671	174,325	870,875	139,427	99,268	99,268	22,321	317,577	24,172	604,877	246,363	228,149
Central Vermont.....8 mos. 433	433	4,531,406	922,003	6,028,639	1,161,773	876,990	876,990	159,465	1,942,772	194,272	4,941,672	931,482	773,602
Chesapeake & Ohio.....Aug. 2,663	2,663	80,889,374	792,483	82,000,000	13,194,201	20,379,884	20,379,884	1,033,170	3,125,442	2,241,825	7,678,840	3,853,123	3,589,754
Chesapeake & Ohio.....8 mos. 2,663	2,663	80,889,374	5,873,030	90,310,155	13,194,201	20,379,884	20,379,884	1,033,170	3,125,442	2,241,825	7,678,840	3,853,123	3,589,754
Chicago & Alton.....Aug. 1,029	1,029	1,655,293	560,294	2,456,083	372,396	543,967	543,967	83,741	906,427	57,477	1,958,135	392,527	196,080
Chicago & Alton.....8 mos. 1,041	1,041	12,685,201	4,220,077	18,633,456	2,404,044	3,967,333	3,967,333	626,945	7,134,460	504,823	14,706,865	3,079,429	2,126,509
Chicago & Eastern Illinois.....Aug. 945	945	1,726,607	386,016	2,310,102	318,827	506,311	506,311	83,323	318,827	69,269	1,839,790	470,312	438,889
Chicago & Eastern Illinois.....8 mos. 945	945	13,660,791	2,838,171	17,874,529	2,173,540	4,040,224	4,040,224	665,182	7,001,015	561,590	14,507,444	2,442,091	1,335,249
Chicago & Illinois Midland.....Aug. 133	133	72,397	5,912	83,585	34,485	74,959	74,959	9,892	48,479	12,670	180,485	39,823	112,585
Chicago & Illinois Midland.....8 mos. 133	133	939,135	71,278	1,040,448	298,282	453,449	453,449	68,398	422,020	103,135	1,345,284	297,836	419,553
Chicago & North Western.....Aug. 8,463	8,463	10,833,368	2,341,994	13,179,653	2,016,637	2,863,396	2,863,396	225,779	5,152,745	2,808,120	10,380,406	3,359,126	2,707,013
Chicago & North Western.....8 mos. 8,463	8,463	70,493,154	17,179,653	98,189,592	13,933,452	19,610,340	19,610,340	1,716,293	37,827,919	2,808,120	76,318,812	15,360,374	14,957,081

Revenues and Expenses of Railways

MONTH OF AUGUST AND EIGHT MONTHS OF CALENDAR YEAR 1927—CONTINUED

MONTH OF AUGUST AND EIGHT MONTHS OF CALENDAR YEAR 1926.																
Name of road	Average mileage operated during period.	Operating revenues.					Operating expenses.					Operating ratio.	Net from railway operation.	Operating income (or loss).	Net operating income, 1926.	
		Freight.	Passenger.	(Inc. misc. Total.	Maintenance of structures, way and equip.	Traffic.										
Chicago, Indianapolis & Louisville. Aug. 8 mos.	9,391	\$11,590,873	\$2,268,535	\$15,184,344	208,951	1,786,099	172,401	317,006	39,874	588,979	31,789	1,488,287	\$9,380,409	\$5,804,009	\$4,106,930	\$3,420,723
Chicago, Burlington & Quincy. Aug. 8 mos.	9,391	73,844,807	14,913,385	98,984,734	708,721	12,386,234	1,193,238	2,564,314	314,135	4,514,411	287,183	8,968,622	71,246,238	17,289,446	17,289,446	17,705,967
Chicago, Milwaukee & St. Paul. Aug. 11 mos.	11,505	1,621,349	1,917,204	14,967,419	1,917,204	14,967,419	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago Great Western. Aug. 8 mos.	1,496	12,441,676	2,168,290	15,876,792	2,250,807	3,127,048	18,577,790	23,862,810	2,515,202	39,205,719	3,069,269	87,992,533	13,024,479	1,061,300	1,061,300	1,459,420
Chicago, Indianapolis & Louisville. Aug. 8 mos.	650	3,411,910	208,951	1,786,099	172,401	317,006	172,401	317,006	39,874	588,979	31,789	1,488,287	\$3,636,393	\$5,804,009	\$4,106,930	\$3,420,723
Chicago, Burlington & Quincy. Aug. 8 mos.	650	9,408,268	708,721	12,386,234	1,193,238	2,564,314	1,193,238	2,564,314	314,135	4,514,411	287,183	8,968,622	2,934,386	17,289,446	17,289,446	17,705,967
Chicago, Milwaukee & St. Paul. Aug. 11 mos.	11,505	1,621,349	1,917,204	14,967,419	1,917,204	14,967,419	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago Great Western. Aug. 8 mos.	1,496	12,441,676	2,168,290	15,876,792	2,250,807	3,127,048	18,577,790	23,862,810	2,515,202	39,205,719	3,069,269	87,992,533	13,024,479	1,061,300	1,061,300	1,459,420
Chicago River & Indiana. Aug. 19	19	79,740,562	12,680,269	102,645,490	18,577,790	23,862,810	2,515,202	39,205,719	3,069,269	87,992,533	87,992,533	1,157,922	1,157,922	1,157,922	1,157,922	1,157,922
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386,683	12,219,175	1,729,348	1,729,348	1,729,348	1,729,348
Chicago, Rock Island & Pacific. Aug. 8 mos.	7,575	9,410,386	1,958,679	12,302,340	1,958,679	12,302,340	3,149,371	3,091,755	311,569	5,185,799	386					

Revenues and Expenses of Railways

MONTH OF AUGUST AND EIGHT MONTHS OF CALENDAR YEAR 1927—CONTINUED

Name of road	Average mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income, 1926
		Freight	Passenger	Total (inc. misc.)	Way and structures	Maintenance of equipment	Traffic				
Evansville, Indianapolis & Terre Haute, Aug. 8 mos.	146	\$314,975	\$4,494	\$319,469	\$29,307	\$29,307	\$2,455	47.7	\$170,053	\$151,548	\$21,646
Florida East Coast, Aug. 8 mos.	857	1,641,070	42,017	1,683,087	228,281	228,281	18,103	63.2	638,154	572,250	2,042,234
Fort Smith & Western, Aug. 8 mos.	848	8,186,237	3,915,955	12,102,192	2,699,669	2,109,556	259,340	100.9	3,171,390	1,092,224	3,832,665
Galveston Wharf, Aug. 8 mos.	13	917,991	97,819	1,015,810	229,790	229,790	4,122	93.4	77,492	77,492	3,805
Georgia R. R., Aug. 8 mos.	328	369,479	81,728	451,207	38,324	38,324	22,339	88.9	119,108	77,492	10,879
Georgia & Florida, Aug. 8 mos.	445	2,941,918	575,841	3,517,759	408,373	706,385	189,470	78.3	104,736	82,951	88,445
Grand Trunk Western, Aug. 8 mos.	347	1,637,591	264,423	1,902,014	326,081	361,552	43,847	68.0	634,980	550,665	136,223
Atlantic & St. Lawrence, Aug. 8 mos.	166	1,353,097	250,245	1,603,342	1,046,379	2,964,850	336,375	72.2	3,212,898	3,236,928	1,222,059
Chic. Det. & Canada Gr. Tr. Jct., Aug. 8 mos.	59	260,195	1,279	261,474	38,868	14,388	4,443	91.9	144,023	41,333	41,387
Detroit, Grand Haven & Mil., Aug. 8 mos.	189	616,120	35,473	651,593	124,386	137,398	36,255	53.3	137,101	126,695	87,597
Great Northern, Aug. 8 mos.	8164	8,592,803	1,272,655	9,865,458	1,688,077	2,015,066	3,999	51.5	1,200,072	1,183,221	843,314
Green Bay & Western, Aug. 8 mos.	234	112,698	5,031	117,729	33,563	20,359	2,326	71.7	2,068,766	1,963,224	1,053,283
Gulf & Ship Island, Aug. 8 mos.	307	282,702	39,334	322,036	118,331	65,969	5,378	62.9	4,223,469	3,294,238	3,024,479
Gulf, Mobile & Northern, Aug. 8 mos.	733	2,013,691	328,241	2,341,932	964,582	462,317	45,440	72.3	19,003,262	12,540,340	13,757,506
Hocking Valley, Aug. 8 mos.	649	4,095,485	248,590	4,344,075	788,243	735,199	237,962	87.7	15,153	7,153	7,914
Illinois Central, Aug. 8 mos.	348	1,706,472	70,554	1,777,026	225,374	370,886	16,529	80.5	1,206,785	919,575	902,279
Illinois Central System, Aug. 8 mos.	4,874	10,695,497	1,226,269	11,921,766	1,717,730	3,289,361	251,874	58.4	832,568	689,010	434,958
Yazoo & Mississippi Valley, Aug. 8 mos.	1,710	1,765,563	356,607	2,122,170	551,367	370,525	48,424	62.8	2,388,897	2,357,641	2,209,993
Kansas City, Mexico & Orient, Aug. 8 mos.	272	284,877	8,171	293,048	66,312	92,071	9,211	75.7	25,026,584	18,210,145	16,715,750
Kans. City, Mex. & Orient of Tex., Aug. 8 mos.	465	608,585	147,821	756,406	173,888	630,633	77,394	84.6	348,506	169,972	308,239
Kansas City Southern, Aug. 8 mos.	784	1,450,319	118,110	1,568,429	196,501	281,188	53,387	86.0	2,369,276	936,250	1,629,016
Texasarkana & Ft. Smith, Aug. 8 mos.	81	252,977	77,634	330,611	1,269,097	3,674,010	300,298	77.0	3,631,966	2,517,313	2,371,880
Kansas, Oklahoma & Gulf, Aug. 8 mos.	326	1,744,569	37,762	1,782,331	1,306,501	214,018	414,876	77.3	27,373,563	19,085,371	18,404,009
Lake Superior & Ishpeming, Aug. 8 mos.	160	289,651	1,462	291,113	268,116	209,671	4,486	77.0	1,033,876	976,804	51,177
Lake Terminal, Aug. 8 mos.	13	99,968	99,968	199,936	15,215	24,586	.....	100.1	264	4,266	5,230
Lehigh & Hudson River, Aug. 8 mos.	96	288,815	2,523	291,338	120,540	170,958	726,355	97.6	47,806	14,205	3,272
Lehigh & New England, Aug. 8 mos.	216	588,368	1,172	589,540	74,429	139,097	57,992	73.5	171,101	164,087	5,020
Lehigh Valley, Aug. 8 mos.	1,363	3,843,923	9,572	3,853,495	405,860	868,644	14,817	77.0	1,033,876	976,804	51,177
Louisiana & Arkansas, Aug. 8 mos.	302	299,851	16,007	315,858	46,292	497,114	1,001	67.1	196,837	169,916	155,728
Louisiana Ry. & Nav. Co., Aug. 8 mos.	337	254,874	15,078	270,000	67,556	29,637	12,937	72.5	1,210,338	1,036,005	1,014,141
	337	1,832,234	100,900	1,933,134	490,969	279,954	100,626	79.9	9,076,065	7,781,012	8,995,362
								67.9	104,546	76,415	61,872
								78.7	506,050	302,621	217,093
								76.0	68,912	22,120	27,892
								89.9	208,514	28,931	—96,610

MONTH OF AUGUST AND EIGHT MONTHS OF CALENDAR YEAR 1927—CONTINUED

Name of road	Average mileage operated during period.	Operating revenues			Maintenance of way and structures		Operating expenses			Operating income (or loss).	Net ry. operating income, 1926.	
		Freight.	Passenger.	Total (inc. misc.)	Equip-ment.	Trans-portion.	Traffic.	General.	Total.			
Louisiana Ry. & Nav. Co. of Tex., Aug. 8 mos.	206	\$82,706	\$5,681	\$91,714	\$25,352	\$11,491	\$3,176	\$37,032	\$6,137	\$83,146	\$4,462	—\$9,518
Louisville & Nashville, Aug. 8 mos.	5,064	10,600,992	1,764,821	13,040,000	172,415	103,670	613,254	257,289	4,400,241	9,452,504	2,833,741	106,351
Louisville, Henderson & St. Louis, Aug. 8 mos.	5,062	77,846,684	13,641,174	96,829,815	22,137,752	14,904,914	2,065,536	33,793,576	2,062,417	73,925,564	13,856,446	18,356,438
Louisville, Henderson & St. Louis, Aug. 8 mos.	199	331,471	51,693	403,274	66,271	67,255	9,620	120,464	12,182	278,117	10,717	59,133
Maine Central, Aug. 8 mos.	1,121	2,118,224	410,785	2,606,588	392,173	386,904	66,165	826,904	96,323	1,912,022	531,104	359,709
Midland Valley, Aug. 8 mos.	1,121	1,182,091	410,430	1,776,736	256,367	330,473	17,416	579,238	59,238	1,310,455	292,309	253,766
Minneapolis & St. Louis, Aug. 8 mos.	1,627	1,578,807	82,073	1,310,161	153,575	233,260	127,093	679,565	451,949	1,082,136	1,900,772	1,849,279
Minneapolis, St. Paul & S. S. Marie, Aug. 8 mos.	364	320,031	23,818	354,515	66,288	37,121	7,602	111,505	14,419	206,442	129,266	129,301
Duluth, South Shore & Atlantic, Aug. 8 mos.	4,396	2,313,536	3,855,322	29,610,106	4,410,437	5,806,322	58,934	683,661	127,095	1,617,305	811,330	688,728
Spokane International, Aug. 8 mos.	165	693,918	82,430	135,160	44,071	9,600	58,272	83,004	11,526	3,075,228	120,735	104,836
Mississippi Central, Aug. 8 mos.	161	972,860	72,719	1,083,442	169,073	209,188	63,030	293,188	63,161	110,201	32,439	37,455
Missouri & North Arkansas, Aug. 8 mos.	364	121,627	17,134	148,660	44,071	16,201	9,600	58,272	83,004	11,526	120,735	104,836
Missouri-Kansas-Texas, Aug. 8 mos.	1,799	18,800,697	2,745,223	23,176,339	3,160,005	4,990,878	527,187	6,016,516	772,386	15,524,939	6,064,393	6,103,792
Missouri-Kansas-Texas, Aug. 8 mos.	1,389	1,192,783	309,239	1,642,199	262,160	183,401	630,530	373,898	55,472	954,395	315,658	305,182
Missouri Pacific, Aug. 8 mos.	7,358	8,858,076	1,321,451	10,180,527	1,964,575	2,701,887	270,187	3,417,434	451,178	8,004,250	2,108,691	1,831,485
Gulf Coast Lines, Aug. 8 mos.	1,004	1,109,448	158,033	1,329,810	262,270	221,991	40,004	373,898	55,472	954,395	315,658	305,182
International Great Northern, Aug. 8 mos.	1,159	8,981,635	1,596,243	11,655,342	2,103,616	2,105,987	299,732	4,885,267	503,555	9,754,283	1,566,695	1,050,221
Texas & Pacific, Aug. 8 mos.	1,954	15,062,954	3,655,968	24,304,939	4,355,537	4,488,537	782,339	8,575,459	797,241	18,847,955	4,206,105	2,999,467
San Antonio Uvalde & Gulf, Aug. 8 mos.	318	140,383	19,496	173,166	27,638	22,149	4,981	63,615	6,465	124,347	45,106	18,077
Texas & Pacific, Aug. 8 mos.	318	1,081,387	166,744	1,350,480	274,804	177,307	41,306	438,360	50,474	986,156	335,283	117,335
Mobile & Ohio, Aug. 8 mos.	1,161	10,377,849	2,107,811	12,500,000	2,107,811	2,107,811	2,107,811	2,107,811	2,107,811	2,107,811	2,107,811	2,107,811
Monongahela, Aug. 8 mos.	169	666,715	21,078	693,836	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000
Monongahela Connecting, Aug. 8 mos.	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montour, Aug. 8 mos.	57	110,154	176	1,374,446	147,761	259,149	3,017	595,032	26,145	1,031,104	269,651	251,890
Nashville, Chattanooga & St. L., Aug. 8 mos.	1,259	11,309,265	2,644,537	15,280,863	2,145,047	3,121,287	677,200	8,560,678	632,400	12,177,280	2,486,643	2,508,596
Nevada Northern, Aug. 8 mos.	163	72,077	4,607	33,932	14,644	5,959	866	14,513	10,443	343,081	318,558	212,621
Newburgh & South Shore, Aug. 8 mos.	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Orleans Great Northern, Aug. 8 mos.	276	262,918	28,509	1,903,796	169,869	289,150	11,226	496,664	35,251	990,934	100,689	131,595
New York Central, Aug. 8 mos.	275	1,870,223	202,409	2,151,321	335,178	401,568	70,091	597,307	85,086	1,504,434	515,436	369,447
Cincinnati Northern, Aug. 8 mos.	244	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,962,147	8,445	3,416,143	614,318	714,330	6,412	127,885	9,406	268,643	120,291	77,576
Cleveland, Aug. 8 mos.	248	2,										

Revenues and Expenses of Railways

MONTH OF AUGUST AND EIGHT MONTHS OF CALENDAR YEAR 1927—CONTINUED

Name of road	Average mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income	Net operating income, 1926
		Freight	Passenger	Total	Maintenance of way and structures	Traffic	Trans-shipment	General	Total					
Michigan Central	1,855	\$5,677,468	\$2,021,895	\$7,699,363	\$1,153,622	\$1,435,046	\$121,429	\$2,564,361	\$5,625,696	65.8	\$2,920,370	\$2,299,531	\$2,312,003	\$2,312,003
Pittsburgh & Lake Erie	1,855	4,276,038	1,113,582	5,389,620	7,158,392	11,234,312	1,007,443	19,811,205	2,097,308	69.2	18,636,297	14,534,939	14,272,132	15,705,008
	231	2,567,407	249,512	2,816,919	453,256	843,174	25,301	838,964	101,184	77.5	2,655,271	468,271	847,317	827,706
	19,505,698	1,376,292	22,074,766	6,931,194	207,753	7,118,960	660,358	18,025,991	81.7	4,048,775	2,685,652	5,607,867	5,725,538	
New York, Chicago & St. Louis	1,691	4,311,409	196,851	4,508,260	685,688	841,343	130,813	1,539,512	141,368	71.2	1,347,583	1,078,432	869,809	839,836
	1,691	3,516,243	1,249,505	4,765,748	4,475,204	6,971,927	996,838	12,436,709	1,274,070	72.6	9,550,131	7,797,195	6,307,410	6,430,419
N. Y., New Haven & Hartford	2,175	6,662,432	4,114,518	10,776,950	1,654,403	2,371,904	93,444	3,861,026	335,299	69.0	3,823,131	3,306,077	2,663,443	2,180,700
	2,175	49,620,332	36,734,010	86,354,342	12,765,575	18,116,263	732,583	31,756,987	67,418,501	73.2	24,714,473	20,526,663	15,153,809	15,690,826
New York Connecting	209	842	.....	240,791	40,176	14,305	.....	45,541	1,830	42.3	138,939	101,439	87,167	95,390
	20	1,716,831	.....	1,950,642	216,424	110,825	.....	452,012	14,232	40.7	1,157,149	845,149	719,673	718,507
New York, Ontario & Western	569	828,082	683,794	1,511,876	288,488	232,727	18,210	564,135	4,607	66.1	1,583,687	533,292	453,897	636,769
	569	5,386,004	2,118,481	8,225,566	1,301,871	1,762,388	144,389	3,769,681	280,567	81.7	1,636,872	1,234,598	801,794	1,542,464
Norfolk & Western	2,241	8,895,387	636,228	9,531,615	1,913,623	105,888	2,399,776	212,231	5,834,598	59.0	4,056,376	3,205,423	3,455,722	3,585,268
	2,241	67,677,660	4,715,471	75,050,329	9,950,946	15,198,363	890,297	1,687,391	47,219,765	62.9	27,830,564	21,020,563	22,924,608	25,484,268
Norfolk Southern	931	577,399	71,898	695,571	84,580	101,206	24,985	278,841	29,528	73.7	183,071	121,084	106,438	143,076
	931	5,633,921	446,178	6,445,281	793,228	989,880	202,755	2,390,505	240,400	70.3	1,911,065	1,482,117	1,208,138	1,224,142
Northern Pacific	6,667	6,533,723	1,060,108	8,367,550	1,098,473	1,618,017	186,471	2,796,257	251,725	71.8	2,358,199	1,679,135	1,883,436	2,746,155
	6,671	43,791,844	8,023,854	57,175,238	8,769,589	11,793,244	1,645,568	20,478,040	2,028,973	79.2	11,896,495	6,536,656	9,209,634	12,167,248
Northwestern Pacific	477	510,298	188,963	763,706	111,175	88,460	9,255	268,248	19,124	65.0	267,453	235,654	208,707	225,496
	477	2,523,157	1,320,857	4,258,459	801,924	550,989	56,313	1,776,636	163,569	81.0	810,463	483,651	398,598	723,330
Pennsylvania R. R.	10,500	40,443,634	12,621,719	58,285,019	7,958,268	11,475,389	830,700	19,666,438	1,549,436	72.9	15,794,685	11,505,356	10,247,998	11,739,378
	10,500	312,379,959	94,488,426	447,157,860	58,045,656	95,427,840	6,345,907	126,664,731	44,490,334	76.8	103,666,554	79,226,948	69,320,502	65,093,474
Baltimore, Chesapeake & Atlantic	130	639,150	63,104	176,306	10,860	26,321	2,797	85,215	3,297	72.9	47,816	30,524	31,903	28,267
	130	639,150	260,725	956,606	94,042	299,090	15,852	631,353	1,067,070	111.5	110,464	152,868	158,206	163,322
Long Island	401	1,073,302	2,743,172	4,442,360	338,767	447,598	30,157	1,415,393	73,814	57.2	1,228,189	1,229,397	1,137,025	1,128,193
	401	7,728,930	17,711,973	27,145,535	3,981,024	4,349,814	270,232	11,330,186	668,199	70.5	6,654,232	4,855,250	3,529,798	3,955,614
West Jersey & Seashore	378	423,816	952,263	1,438,042	203,295	206,560	32,998	536,746	33,091	70.5	424,340	99,117	78,467	235,959
	378	3,323,408	4,417,228	8,109,113	1,264,970	1,329,669	152,566	3,717,369	210,824	82.4	1,427,594	636,375	524,666	778,383
Penia & Pekin Union	19	29,330	1,885	172,964	35,957	11,949	2,099	66,733	8,794	72.6	47,432	30,432	60,940	36,349
	19	196,351	1,966	1,216,121	18,776	11,749	1,128	53,505	63,199	72.6	330,844	185,270	350,276	405,820
Pere Marquette	2,243	3,684,762	395,121	4,447,213	3,956,868	741,228	70,310	1,308,811	103,977	62.8	1,617,807	1,411,756	1,107,807	1,107,807
	2,244	25,819,327	2,264,018	29,854,314	3,395,911	6,242,135	501,513	10,027,120	892,882	70.7	8,744,169	7,107,373	6,128,420	6,082,955
Pittsburgh & Shawmut	102	197,547	2,012	201,755	23,976	43,641	1,690	47,598	6,694	61.3	78,156	76,897	85,291	40,942
	102	1,130,636	30,760	1,180,616	173,577	385,439	12,908	335,529	74,489	83.2	198,668	189,129	261,869	332,503
Pittsburgh & West Virginia	92	259,323	6,592	297,656	29,596	57,445	10,638	63,356	29,883	67.7	96,238	57,604	124,581	276,738
	92	2,523,645	49,706	2,827,373	185,198	493,827	78,762	575,619	213,628	58.2	1,182,875	802,042	1,314,831	1,630,239
Pittsburgh, Shawmut & Northern	198	164,719	1,900	169,556	37,481	28,172	1,611	52,226	5,709	73.9	44,357	41,306	34,017	30,581
	198	1,155,692	20,716	1,204,528	246,538	236,580	12,529	460,160	52,729	106.1	195,992	172,045	91,502	139,634
Quincy, Omaha & Kansas City	249	373,096	98,929	530,345	252,996	95,279	893	30,031	2,496	113.9	4,635	10,458	14,315	6,884
	249	3,730,996	98,929	530,345	252,996	95,279	893	30,031	2,496	113.9	4,635	10,458	14,315	6,884
Reading	1,139	6,851,618	737,949	7,945,290	1,225,714	1,696,841	87,154	2,774,109	187,369	75.2	1,968,658	1,505,891	1,627,517	1,626,226
	1,139	53,171,622	5,971,019	62,044,927	8,657,784	14,068,116	656,600	23,423,377	1,630,412	78.1	13,576,598	10,158,196	10,088,154	12,748,674
Atlantic City	161	137,180	503,759	663,400	36,450	36,450	4,602	245,919	4,602	55.1	26,783	25,471	213,158	302,738
	161	1,031,750	1,836,399	3,022,601	690,289	264,704	54,078	1,627,424	47,564	88.8	37,449	15,252	199,883	185,076
Perkiomen	41	116,656	5,768	125,530	9,272	9,272	106	49,089	1,194	57.6	33,210	47,689	40,356	60,647
	41	781,100	36,126	841,888	98,198	52,180	861	372,091	9,293	63.3	308,902	268,996	212,014	327,813
Port Reading	19	164,808	.....	210,092	20,275	34,310	.....	66,770	1,464	58.7	86,844	72,673	21,175	50,841
	19	1,522,837	.....	1,664,940	243,457	89,087	1,832	576,141	20,073	55.9	734,382	604,272	94,717	13,282
Richmond, Fredericksburg & Potomac	117	392,090	294,541	841,430	140,307	155,942	8,686	298,423	34,850	78.2	183,159	144,352	115,115	232,830
	117	3,970,988	2,745,792	8,090,000	1,002,704	1,366,412	71,933	2,912,786	295,343	72.6	2,213,469	1,755,756	1,281,015	2,062,999
Rutland	413	329,453	123,854	602,250	107,633	101,022	10,496	224,160	10,982	75.6	146,557	112,271	113,206	124,505
	413	2,517,345	767,883	4,202,777	746,166	822,688	86,863	1,691,374	113,544	64.8	729,049	508,646	563,438	624,762
St. Louis-San Francisco	4,951	5,933,451	1,280,680	7,692,510	1,057,483	1,382,880	111,219	2,257,563	232,867	82.7	2,710,426	2,227,372	2,272,000	2,233,365
	4,951	42,311,503	9,459,501	55,773,594	7,711,333	11,038,289	920,076	18,357,465	1,953,430	70.8	16,299,922	13,138,250	13,581,471	14,619,561
Ft. Worth & Rio Grande	233	85,352	15,167	111,487	34,381	20,974	3,118	52,900	5,943	104.6	5,202	9,270	17,723	18,518
	233	625,478	120,263	830,355	205,590	173,206	26,044	422,928	43,535	104.6	38,466	71,037	137,556	146,767
St. Louis, San Francisco & Texas	137	117,992	13,788	135,728	35,812	23,169	4,321	56,065	7,369	93.4	9,011	6,485	13,667	37,207
	137	1,140,993	109,844	1,283,833	253,985	217,245	40,637	1,048,989	61,599	81.7	234,844	213,890	30,055	100,994
St. Louis Southwestern	940	1,175,364	114,340	1,363,551	176,810	183,669	64,162	361,176	65,895	63.2	501,425	421,892	336,428	385,468
	940	9,592,480	800,735	10,990,685	2,000,587	1,712,225	515,436	2,981,974	521,027	71.2	3,169,000	2,701,570	2,071,098	2,531,462
St. Louis, Southwestern of Texas	807	492,607	58,927	598,258	102,887	109,877	28,675	250,692	34,326	88.8	67,245	40,491	84,026	11,856
	807	3,773,698	419,722	4,578,592	1,455,714	917,444	226,252	1,948,491	266,405	105.8	266,405	482,356	75,385	36,287
Seaboard Air Line	4,318	3,443,572	647,042	4,487,607	704,349	704,349	208,522	1,768,959	209,965	77.6	1,005,739	730,015	776,185	974,044
	4,283	31,846,452	6,936,527	42,529,341	5,228,874	6,325,865	1,643,045	16,484,966	1,647,865	75.2	10,546,295	8,057,228	7,365,062	7,576,944

Revenues and Expenses

Continued

MONTH OF AUGUST AND EIGHT MONTHS OF CALENDAR YEAR 1927—Continued														
Name of road	Average mileage operated during period.	Operating revenues—		Total (inc. misc.)	Maintenance of way and structures.	Equip-ment.	Operating expenses		General.	Total.	Operating ratio.	from railway operation.	income (or loss).	1926.
		Freight.	Passenger.				Traffic.	Trans-portion.						
Southern Ry. Aug. 8 mos. 314	6,771	\$9,224,089	\$2,403,534	\$12,515,316	\$1,605,371	\$2,013,478	\$4,043,132	\$242,821	\$4,043,132	\$351,214	66.6	\$3,331,429	\$2,885,387	
Alabama Great Southern. Aug. 8 mos. 314	6,771	7,248,735	1,814,466	9,063,201	1,459,127	1,799,562	3,171,232	2,062,912	3,171,232	273,201	72.6	\$4,181,583	\$3,388,845	
Alabama Great Southern. Aug. 8 mos. 314	6,771	7,248,735	1,814,466	9,063,201	1,459,127	1,799,562	3,171,232	2,062,912	3,171,232	273,201	72.6	\$4,181,583	\$3,388,845	
Cinn. New Orleans — Texas Pacific Aug. 8 mos. 401	2,185,495	775,025	3,174,490	696,399	75,427	684,682	1,563,613	185,422	4,986,147	185,422	74.1	1,744,937	1,491,439	591,061
Georgia Southern & Florida. Aug. 8 mos. 401	2,185,495	775,025	3,174,490	696,399	75,427	684,682	1,563,613	185,422	4,986,147	185,422	74.1	1,744,937	1,491,439	591,061
New Orleans & Northeastern. Aug. 8 mos. 204	344,250	316,206	1,907,235	2,303,822	299,140	355,259	513,034	55,265	1,282,760	55,265	65.9	664,810	518,234	4,139,109
Northern Alabama. Aug. 8 mos. 110	219,817	635,506	8,882	106,086	75,427	684,682	1,563,613	423,354	10,480,883	423,354	70.3	4,426,402	3,350,242	67,469
Northern Alabama. Aug. 8 mos. 110	219,817	635,506	8,882	106,086	75,427	684,682	1,563,613	423,354	10,480,883	423,354	70.3	4,426,402	3,350,242	67,469
Southern Pacific. Aug. 8 mos. 8,945	14,060,791	3,899,126	19,725,127	2,370,925	1,216,193	1,587,714	2,177,556	268,812	4,893,308	268,812	65.0	6,902,597	4,813,922	5,203,721
Steamship Lines. Aug. 8 mos. 8,931	99,252,546	27,755,329	140,138,587	19,667,420	1,133,449	1,133,449	1,133,449	1,133,449	1,133,449	1,133,449	87.1	40,131,287	26,173,559	27,068,923
Texas & New Orleans. Aug. 8 mos. 554	4,256,209	876,029	5,600,162	801,061	787,020	91,994	1,638,244	184,484	3,543,409	184,484	63.3	2,056,753	1,430,676	1,352,610
Spokane, Portland & Seattle. Aug. 8 mos. 296	271,908	198,030	1,157,709	238,802	113,449	177,888	3,517,720	34,740	823,352	34,740	74.2	155,063	94,545	70,427
Tennessee Central. Aug. 8 mos. 55	1,886,848	112,298	15,760	188,494	175,427	32,344	481,636	6,113	83,366	6,113	79.6	90,550	70,427	14,552
Terminal Railroad Assn of St. L. Aug. 8 mos. 162	820,543	7,312	112,298	15,760	188,494	175,427	32,344	481,636	6,113	4,992	77.3	313,080	160,951	406,606
Texas Mexican. Aug. 8 mos. 239	157,853	3,551	168,990	238,802	113,449	177,888	3,517,720	34,740	823,352	34,740	74.2	155,063	94,545	70,427
Toledo, Peoria & Western. Aug. 8 mos. 28	1,886,848	112,298	15,760	188,494	175,427	32,344	481,636	6,113	83,366	6,113	79.6	90,550	70,427	14,552
Toledo Terminal. Aug. 8 mos. 28	1,886,848	112,298	15,760	188,494	175,427	32,344	481,636	6,113	83,366	6,113	79.6	90,550	70,427	14,552
Trinity & Brazos Valley. Aug. 8 mos. 367	1,518,469	70,920	1,641,288	404,660	103,631	134,092	1,349,590	104,843	5,798,975	104,843	70.8	1,059,618	806,492	689,934
Union Pacific. Aug. 8 mos. 3,711	9,126,659	1,595,524	11,592,818	1,445,981	2,054,513	153,589	2,716,988	321,294	6,914,843	321,294	59.6	4,677,975	3,205,727	2,620,464
Union Pacific. Aug. 8 mos. 3,713	9,126,659	1,595,524	11,592,818	1,445,981	2,054,513	153,589	2,716,988	321,294	6,914,843	321,294	59.6	4,677,975	3,205,727	2,620,464
Union Pacific. Aug. 8 mos. 2,539	16,818,635	2,889,681	21,461,340	4,040,819	3,783,667	425,464	6,547,621	949,272	16,221,489	949,272	66.2	3,012,553	1,513,897	583,893
Oregon Short Line. Aug. 8 mos. 2,237	2,415,501	391,467	3,035,726	489,215	387,379	73,651	918,934	122,184	2,018,244	122,184	66.5	1,017,482	827,057	663,607
Oregon Wash. R. R. & Nav. Co. Aug. 8 mos. 1,208	1,416,095	3,452,726	16,772,776	3,203,005	3,094	112,584	119,060	15,166	283,593	119,060	61.8	387,496	268,948	170,923
Oregon Wash. R. R. & Nav. Co. Aug. 8 mos. 1,208	1,416,095	3,452,726	16,772,776	3,203,005	3,094	112,584	119,060	15,166	283,593	119,060	61.8	387,496	268,948	170,923
Los Angeles & Salt Lake. Aug. 8 mos. 258	319,046	15,750	356,726	103,330	49,419	24,321	269,753	2,921	316,964	2,921	79.5	73,133	59,135	36,071
St. Joseph & Grand Island. Aug. 8 mos. 258	1,851,574	106,751	2,058,325	271,664	24,321	269,753	2,921	316,964	2,921	271,664	79.5	73,133	59,135	36,071
Utah. Aug. 8 mos. 111	1,083,214	58,258	1,860,396	440,421	55,521	1,860,019	362,671	1,498,753	2,379,773	362,671	77.2	593,293	3,663,415	3,863,690
Virginian. Aug. 8 mos. 254	4,691,583	748,712	5,440,295	866,874	96,589	362,862	1,336,116	17,434,915	1,465,456	1,465,456	78.0	9,848,721	7,772,009	5,522,718
Wabash. Aug. 8 mos. 254	35,976,570	5,583,508	44,731,137	6,664,383	7,955,375	13,701	182,105	10,967	382,484	10,967	77.9	108,399	81,065	60,806
Ann Arbor. Aug. 8 mos. 293	438,131	27,047	490,983	80,561	96,589	362,862	1,336,116	17,434,915	1,465,456	1,465,456	78.0	9,848,721	7,772,009	5,522,718
Western Maryland. Aug. 8 mos. 804	13,997,094	2,379,773	16,376,867	3,187,514	312,141	4,800,482	42,318	1,266,726	68.1	42,318	73.0	480,793	352,299	348,451
Western Pacific. Aug. 8 mos. 1,042	8,062,307	1,219,911	9,282,218	1,472,385	92,477	2,915,450	361,418	10,407,697	73.0	361,418	73.0	480,793	352,299	348,451
Wheeling & Lake Erie. Aug. 8 mos. 511	11,533,118	262,977	12,675,606	1,597,773	3,107,021	271,243	3,862,442	505,175	50,141	505,175	72.7	3,455,441	2,397,620	2,433,150

News of the Week

(Continued from page 737)

the appointment of George P. Baldwin, vice-president General Electric Company, as an executive member of the association, succeeding Charles J. Symington, resigned.

G. N. Receives Favorable Decision in Train Control Suit

In a suit brought by the General Railway Signal Company, Rochester, N. Y., against the Great Northern, directed against the forestalling feature of the Sprague Safety Control & Signal Corporation's system of train control which had been installed and is in use on the Great Northern, Judge John B. Sanborn in the U. S. District Court of Minnesota, on September 19, rendered a decision in favor of the defendant on the ground of non-infringement and ordered a dismissal of the case. The suit was brought on Howe patent No. 1,551,515 relating to the "forestalling" feature as at present allowed under the July, 1924, order of the Interstate Commerce Commission and practiced on many railroads. The Court held that, in view of the disclosures in earlier patents, including an early Sprague British patent, "if the Howe patent involved invention at all, the claims can receive only a very narrow construction, and that Howe is practically limited to the exact structure described by him." The Court concluded, "I do not hold the patent invalid, but I do hold that there was no infringement."

Medals for N. Y. C. Employees

At a ceremony held in the rooms of the board of directors of the New York Central in New York on October 6, President P. E. Crowley voiced the recognition by the directors of heroic acts performed by 15 employees of the company during the year 1926, these 15 cases representing the outstanding acts among a large number of cases of meritorious behavior which have been reported to the management by officers of the road for the year named. The medal is of bronze, 1½ inches in diameter.

The ceremonies were in charge of Vice-President John G. Walber and were attended by a large number of officers of the road. The recipients of medals were:

New York Central: William G. Waechter, chief general signal inspector; E. Dombroski, police sergeant; Samuel Somerville, first deckhand; Frank Gribble, deckhand; Arthur Beckner, yard brakeman.

Cleveland, Cincinnati, Chicago & St. Louis: Lewis Little, yard conductor; Henry Mansfield, locomotive engineman; Harry Slattery, locomotive fireman; David Thomas, Jr., yard brakeman; T. A. Crotty, locomotive engineman; W. Gallagher, locomotive fireman; C. D. Yeazel, yard brakeman; and W. E. Rocknor, yard brakeman.

Michigan Central: Frank Halpin, section foreman.

Pittsburgh & Lake Erie: P. J. Reidy, shipping clerk.

Accounting Rules Hearings

The Interstate Commerce Commission, in response to various requests, has decided to make its general revision of the accounting rules for steam railroads the subject of a public hearing, to begin at Washington on November 9, and also to hold such hearing in connection with the further hearings in relation to its orders prescribing systems of depreciation charges for railroads and telephone companies, the effective dates of which had been postponed.

The commission has been informed, it says, that the National Industrial Traffic League is prepared to present and support a revision "involving a marked departure from the system of accounting which is now followed." It has also been represented, its notice says, that there is such an interrelation between the general division of the accounting rules and the matter of depreciation charges that the two subjects should be considered together or at least in close proximity.

The commission has announced a tentative program for the hearings, beginning with the introduction of tentative drafts of the proposed revision heretofore made public by its Bureau of Accounts and the evidence of the National Industrial Traffic League. An effort will be made to keep the records in the three proceedings, accounting rules, and depreciation for railroads and telephone companies, separate, but it is stated that it may prove desirable for the commission to consider them together.

Traffic

F. W. Wesco, formerly of the Iowa State College of Agriculture has been appointed poultry development agent of the agriculture department of the Missouri Pacific.

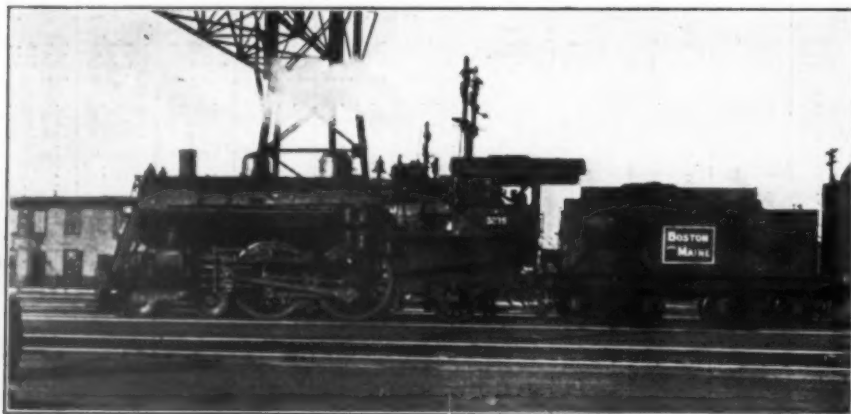
The Delaware, Lackawanna & Western announces that its "Chicago Limited" leaving New York at 2 p. m. now has sleeping cars for Chicago over the Michigan Central, running through in 25 hours; and the corresponding eastbound run, leaving Chicago at 9 p. m., arrives in New York at 7:30 p. m.

The Interstate Commerce Commission has denied petitions for a modification of its order in the New England divisions case filed by the Delaware & Hudson, the Baltimore & Ohio, the Western Maryland, the Central of New Jersey, the Delaware, Lackawanna & Western, the Erie, the New York, Susquehanna & Western, the Wilkes-Barre & Eastern, the Lackawanna & Wyoming Valley, the Lehigh & New England, the Lehigh Valley, and the Reading.

The Central of Georgia has now been taking the public into its confidence, by means of paid advertisements in the newspapers, for more than six years and the last advertisement issued says that the result amply justifies the policy. These monthly manifestoes have occasionally been reproduced in the columns of the *Railway Age*. The company feels justified in the conclusion that its campaign of open and free discussion has been one of the elements in bringing about the era of better feeling and mutual understanding between the railroads and their patrons which now exists.

The North American Car Corporation has recently leased from the Missouri-Kansas-Texas the oil terminal of the latter company at Galveston, Tex., and through its subsidiary, the Gulf States Terminal and Transport Company, is operating the plant in conjunction with its export terminal at New Orleans, La. These terminals are operated in connection with the tank car fleet of the North American Car Corporation. Over 5,000 carloads of oil have been handled since January, 1927, and current contracts cover various commodities including crude and refined petroleum for export and over 5,500,000 gal. of import molasses.

The annual convention of the American Association of Railroad Ticket Agents was held at Washington, D. C., beginning on October 11. Addresses were made at the opening session by J. J. Esch, chairman, and R. V. Taylor, of the Interstate Commerce Commission; James Keeley, assistant to the president, Pullman Company; F. W. Robinson, vice-president, Union Pacific; E. S. Barney, general passenger agent, Hudson River Day Line; W. B. Calloway, passenger traffic manager, Baltimore & Ohio; W. E. Pollen,



The B. & M. Is Now Stenciling Its Label on Locomotive Tenders

past president of the association; A. G. Bloom, president of the association, and C. M. Knowles, editor of the Ticket Agent, official organ of the association.

President Opposes Permanent Government River Freight Service

A committee of users of the government barge line service on the Mississippi river that called on the President and the Secretary of War on October 7 to urge that Congress be asked to authorize an increase of \$50,000,000 in the capital stock of the Inland Waterways Corporation, to enable it to greatly enlarge its service, received little encouragement from the President, it was indicated afterward at the White House.

The committee, in a letter to the advisory committee of the Inland Waterways Corporation, took the position that the corporation had "failed of its full purpose" to "give the landlocked states of the Mississippi Valley access to tidewater," and has outgrown its equipment and facilities.

President Coolidge let it be known, however, that he believes the federal government should do everything possible to encourage private initiative rather than encourage the idea of putting the government permanently in the business of carrying freight on the inland water ways, and that he understands that the barge lines were to be in the nature of demonstration lines, to determine whether or not it would be possible for such transportation to be operated successfully by private capital. He does not understand that it was the intention of Congress in appropriating for the barge lines to embark the United States definitely in the business of freight transportation; but that the law provides that the experimental routes shall be disposed of by the government under the general policy that such work can be better done by private initiative than by the government.

Foreign Railways

What It Costs the Englishman to Commute

By reason of a readjustment in passenger fares ordered by the Railway Rates Tribunal, the British railways have filed new tariffs for season tickets. Season tickets entitle the holder to an unlimited number of rides during the period and between the points named.

They are usually sold for periods of several months.

The following table, taken from the Times (London), gives the new scale of rates for 6 months and three months, respectively (second class omitted):

Miles	Six months				Three months			
	1st Cl.	s.	d.	3rd Cl.	1st Cl.	s.	d.	3rd Cl.
1	3	0	0	2	0	0	1	10
2	4	2	6	2	15	0	2	13
3	5	5	0	3	10	0	2	12
4	6	0	0	4	0	0	3	0
5	6	15	0	4	10	0	3	7
6	7	10	0	5	0	0	3	15
7	8	5	0	5	10	0	4	2
8	9	0	0	6	0	0	4	10
9	9	15	0	6	10	0	4	17
10	10	10	0	7	0	0	5	5
11	11	3	6	7	9	0	5	11
12	11	17	0	7	18	0	5	18
13	12	10	6	8	7	0	6	5
14	13	4	0	8	16	0	6	12
15	13	17	6	9	5	0	6	18
16	14	6	6	9	11	0	7	3
17	14	15	6	9	17	0	7	7
18	15	4	6	10	3	0	7	12
19	15	13	6	10	9	0	7	16
20	16	2	6	10	15	0	8	1

Insofar as unlimited tickets, issued for several months can be compared with the 60-ride monthly ticket in America, the monthly charge (third class, which gets the bulk of the business) for a 20-mile daily round trip works out at \$8.66 (£5 7s. 0d. converted to the American equivalent and divided by 3). The same charge for first class service per month is equivalent to \$13.06.

Britain Sets Up New Non-Stop Record

Great Britain, which has for years held the record in operating trains over long distances with no intermediate stops for any purpose—traffic or service—established a new high mark in this field when, on September 26, the London, Midland & Scottish placed its "Royal Scot" on a non-stop basis between London (Euston) and Carlisle, 299¼ miles. Previous to the past summer the Great Western had held the record with its Cornish Riviera Express, which does not stop between London and Plymouth, 225 miles. At the beginning of the summer, however, the London, Midland & Scottish began running the "Royal Scot" non-stop between London and Carnforth, 236 miles, and, at the same time, the London & North Eastern established a non-stop schedule between London and Newcastle-on-Tyne, 268 miles. This latter schedule has now been withdrawn for the winter.

The "Royal Scot's" scheduled speed in the non-stop section is not excessive, 52 m.p.h. The "Cornish Riviera Express" still holds that record among the long non-stop trains, i.e., 56.5 m.p.h. The L. M. S. management explains that in setting up its schedule an attempt has been made to provide for a high degree of on-time performance and that high-speed records have been subordinated to this purpose. There are three severe grades on the line—about 1.4 per cent—of which one is almost 5 miles long.

The "Royal Scot" is composed, according to the Railway Gazette (London), of 15 cars and weighs 420 long tons (470 short tons). It is in effect two trains and divides at Symington, Scotland, one part going to Glasgow and the other to Edin-



Wide World

The L. M. S.'s "Royal Scot"

burgh. The train is provided with both center-aisle (i.e., American style) cars and with the customary compartment-corridor cars. All seats in the train are reversible. Meals are served throughout the day and a uniformed attendant travels on the train, his special business being to answer inquiries from passengers regarding train schedules, etc., and to point out interesting sights en route. The trains leave at 10 a. m. and arrive at destination at 6:15 p. m.

Locomotives used on the "Royal Scot" are of the 4-6-0 type with three cylinders, recently received from the builder. They develop 33,150 lb. tractive force at 85 per cent of boiler pressure, which is 250 lb. The weight of the engine in working order (exclusive of tender) is 190,176 lb. The tender carries 6.16 tons of coal.

Indian Railways in 1926-27

Operating results for the Indian railways, for the fiscal year ended March 31, 1927, according to a preliminary abstract of statistics issued by the Indian Railway Board indicate that on March 31, the investment (capital at charge) in state lines operated by the state amounted to approximately \$1,497,620,160, and in state lines operated by companies or by Indian states amounted to approximately \$1,014,103,160, and there was a grand total of investment in state-owned Indian railways of approximately \$2,523,849,480, as compared with \$2,430,831,960 in 1925-26.

Net revenue of state-owned lines in 1926-27 amounted to \$125,043,480 as against \$127,036,440 in the preceding fiscal revenue. The per cent of net revenue to "capital at charge" in 1926-27 was 4.95 as compared with 5.23 in 1925-26. There was a total of \$99,088,920 in capital charges against the net revenue in 1926-27 which gave the government a clear profit of 1.02 per cent as compared with a profit of 1.29 per cent in 1925-26.

Gross earnings of all railways, state and private, in 1926-27 amounted to \$404,483,760 and operating expenses amounted to \$250,922,880, resulting in an operating ratio of 62.04 per cent. There was a grand total of route mileage in 1926-27 of 39,048.88, which was divided between the lines of different gages as follows: 5

ft. 6 in., 19,367.44; 3 ft. 3 $\frac{3}{8}$ in. (meter), 15,931.81; and 2 ft. 6 in. and 2 ft., 3,749.63. There were at the end of the fiscal year under construction 2,255.97 miles of line.

There was a total of 604,371,800 passengers carried by all railways during the year of 1926-27 as against 599,144,800 in the preceding year. Total passenger miles in 1926-27 amounted to 20,366,250,000 as against 20,331,752,000 in the previous year. The average passenger trip, including all classes was 33.7 miles in 1926-27 as against 33.9 the previous year. The average rate per mile, varying from first class through second and intermediate to third class, was 0.7 cents.

There were 94,336,000 tons of freight carried in 1926-27 (all railways) and the average haul was 237.4 miles. The average earning per ton mile was 1.37 cents. Total earnings from passenger traffic amounted to \$137,124,280. Total earnings from freight traffic amounted to \$233,975,880.

Passenger train miles in 1926-27 amounted to 74,967,000 as against 69,541,000 in the previous year. Total freight train miles amounted to 57,328,000 as against 57,411,000 in the previous year. Total train mileage including mixed and work trains amounted to 170,720,000 as against 162,258,000 in 1925-26.

The investment per route mile for all Class 1 railways* in 1926-27 was \$77,675. The gross earnings per mile operated amounted to \$11,026 and the net earnings per mile operated were \$4,206 and net earnings per train mile were 92 cents.

* Those having gross revenues in excess of at least \$1,800,000 per annum.

W. E. Watson, divisional superintendent of colonization and agriculture of the Canadian National, with headquarters at Saskatoon, Sask., has been promoted to superintendent of farm employment, with headquarters at Winnipeg, Man.

A total of 25,409 people, at 41 points, viewed the exhibits displayed at the Chicago, Burlington & Quincy wheat smut special which recently made a two weeks' tour through the wheat growing sections to illustrate the great losses caused by wheat smut and the means of combating the disease.

Equipment and Supplies

Locomotives Lead Week's Equipment Market

Interest in locomotives is the feature of this week's equipment market, after a period of very little activity in the field. The Detroit & Toledo Shore Line has an inquiry out for from 3 to 4 Mikado type locomotives. The Missouri-Illinois has ordered two consolidation type locomotives from the American Locomotive Company. The Ferrocarril de Pacifico, Colombia, has ordered 10, 4-8-0 type locomotives from Baldwin.

The Argentine State Railways have applied to the government for funds to buy railroad material and equipment, including 60 locomotives.

In the field of passenger cars, there was some activity with the Chicago, North Shore & Milwaukee placing an order for 16 coaches, 1 parlor car, and 2 dining cars with the Pullman Car & Manufacturing Company.

The Chicago, Milwaukee & St. Paul has an inquiry out for 10 baggage cars.

Locomotives

THE DETROIT & TOLEDO SHORE LINE is inquiring for from 3 to 4 Mikado type locomotives.

THE MISSOURI-ILLINOIS has ordered 2 Consolidation type locomotives from the American Locomotive Company.

THE FERROCARRIL DE PACIFICO (Colombia) has ordered ten 4-8-0 type locomotives from the Baldwin Locomotive Works.

THE ARGENTINE STATE RAILWAYS have applied to the government for funds to buy railroad material and equipment, including 60 locomotives.

Freight Cars

THE CARNEGIE STEEL COMPANY is inquiring for four flat cars of 70 tons' capacity.

THE ST. LOUIS SOUTHWESTERN has ordered 10 steel underframes for box cars from the American Car & Foundry Co.

Passenger Cars

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 10 baggage cars.

THE CHICAGO NORTH SHORE & MILWAUKEE has ordered 15 coaches, 1 parlor car and 2 dining cars from the Pullman Car & Manufacturing Corporation.

THE BOSTON & MAINE has ordered the necessary material for converting one mechanical gasoline rail motor car to a gas-electric, from the J. G. Brill Company.



A Vienna-Salzburg Train on the Austrian Federal Railways

Machinery and Tools

THE NEW YORK CENTRAL has ordered a 100-ton bushing press from the Niles-Bement-Pond Company.

THE GRAND TRUNK has ordered a 90-in. heavy driving wheel lathe from the Niles-Bement-Pond Company.

Iron and Steel

THE MISSOURI-KANSAS-TEXAS is inquiring for 12,500 tons of rails.

THE BOSTON & MAINE has ordered 150 tons of steel for use at Concord, Massachusetts.

THE PENNSYLVANIA is inquiring for from 100,000 to 200,000 tie plates with the necessary spikes.

THE READING has ordered 175 tons of steel for a bridge near Philadelphia, Pa., from the Bethlehem Steel Company.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 400 tons of structural steel for a cafeteria and fire department buildings at Topeka, Kan.

THE PERE MARQUETTE has ordered 100 tons of structural steel for grade crossing elimination work in Detroit from the McClintic-Marshall Company.

THE UNION PACIFIC has ordered 13,000 tons of rail from the Illinois Steel Company, 4,000 tons from the Inland Steel Company and 13,000 from the Colorado Fuel & Iron Company.

THE PENNSYLVANIA has ordered 1,100 tons of steel for sub-station work near Philadelphia, Pa., from the Belmont Iron Works, and has also placed an order for 300 tons of bridge steel.

THE ATCHISON, TOPEKA & SANTA FE order for rail reported in the *Railway Age* of October 8 was divided as follows: 85,000 tons of rails from the Colorado Fuel & Iron Co., 17,000 tons from the Illinois Steel Company, 17,000 tons from the Inland Steel Company and 2,300 tons from the Bethlehem Steel Company.

Signaling

THE BOSTON & MAINE has contracted with the Union Switch & Signal Company for the installation of an electro-pneumatic interlocking at Ayer Junction, Mass.—a 39-lever machine. Color light signals will be used.

THE INTERSTATE COMMERCE COMMISSION has ordered the railroads of Alabama to cease practicing unjust discrimination in the rates for the intrastate transportation of fertilizers in relation to the interstate rates and to establish, on or before January 3, rates which shall not be less, for corresponding distances, than the rates contemporaneously applied for interstate service in accordance with the commission's order of July 30, 1926.

Supply Trade

Batchelder & Co., Chicago, has been placed in charge of the railroad sales of the Klauer Manufacturing Company, Dubuque, Iowa.

The Jones & Laughlin Steel Co. has moved its Chicago branch into its new two-story warehouse and office building at 2250 W. Forty-seventh Street.

The Whiting Corporation, Harvey, Ill., has appointed J. F. Shouse & Co., Louisville, Ky., its sales representative for Kentucky and the southern part of Indiana.

The Morse Twist Drill & Machine Co., New Bedford, Mass., has opened a store at 92 Lafayette street, New York City where it has put in a complete stock of its products.

J. H. Somerville until recently connected with the Philadelphia office of the Reading Iron Company, Reading, Pa., has been appointed associate of W. J. White, district sales representative of the Baltimore office. Mr. Somerville will represent Reading Iron Company in the south. C. M. Barr succeeds Mr. Somerville in Philadelphia.

Harry J. Steinbreder, president of the Fulton Iron Works, St. Louis, Mo., has been elected chairman of the board of directors of the Foos Engine Company, Springfield, Ohio, and George Foos has been elected president. The Fulton Iron Works has acquired an interest in the Foos Engine Company, which will permit the grouping of the sales of the products of both companies, each company, however, retains its separate identity.

The Hazard Manufacturing Company, Wilkes Barre, Pa., has decided to separate into two companies its two distinct lines of business, retaining its present corporate name in the manufacture and sale of insulated wires and cable. A corporation chartered in Pennsylvania as the Hazard Wire Rope Company will take over the manufacture and sale of wire rope formerly carried on by the Hazard Manufacturing Company. The present management of the Hazard Manufacturing Company is retained by both companies.

The Union Switch & Signal Company has entered into an agreement with the General Electric Company whereby the latter company acquires an exclusive license, for all fields except railway light signals, under the rebased lamp patents owned by the Union Switch & Signal Company. It is understood that this license inures to the benefit of the Westinghouse Lamp Company under a license which the latter company has from the General Electric Company. The Union Switch & Signal Company retains all rights under these patents

for the railway light signal field, and will continue to furnish rebased lamps to railroads for use in light signals.

Frank H. Clark, formerly general superintendent of motive power of the Baltimore & Ohio and, more recently, technical adviser to the Chinese Ministry of Communication, has opened an office as consulting engineer at 949 Broadway, New York, where he will undertake examinations and reports on railway and allied industrial problems and undertakings. Mr. Clark entered railway service with the Chicago, Burlington & Quincy, in the employ of which he spent 16 years, serving respectively in the positions of chief draftsman, me-



F. H. Clark

chanical engineer, superintendent of motive power and general superintendent of motive power. In 1910 he was appointed general superintendent of motive power of the Baltimore & Ohio and served in that capacity for 8 years. Then for a brief period he was engaged in consulting work in New York and in 1919 went to China as technical adviser to the Ministry of Communication. Mr. Clark has served as president of both the American Railway Master Mechanics' Association (part of 1918-19) and the Master Car Builders' Association (1910-11).

Timken Purchase of British Interests

The Timken Roller Bearing Company, Canton, Ohio, and M. B. U. Dewar, of London, England, have together, purchased from Vickers, Ltd., all of the capital stock of British Timken, Ltd. This purchase gives Timken complete control, throughout the world, of the manufacture and sale of Timken bearings.

Mr. Dewar, who now assumes active management of British Timken affairs, was until recently managing director of the Metropolitan Carriage, Wagon & Finance Co., Ltd., of Birmingham, England, and he was also a member of the Industrial Management Board of Vickers, Ltd.

The Birmingham plant of British

Timken, Ltd., is being enlarged, and new machinery and equipment have been installed. Officers of British Timken, Ltd., are now at the Canton, Ohio, works making final arrangements for the immediate establishment of factories in France and Germany. Previously the British Timken, Ltd., has operated for many years under license from the Timken Roller Bearing Company. Its products are used in British touring cars, motor trucks, buses and motorcycles.

Obituary

Arthur C. Smith, vice-president of the Morden Frog & Crossing Co., Chicago, who died at Elmhurst, Ill., on October 1, was born in London, England, in 1871 and came to the United States in 1878. After graduating from Lewis Institute, Chicago, he entered the employ of the Illinois Central in the engineering department at Chicago. Later he was em-



A. C. Smith

ployed in the chief engineer's office of the Union Pacific at Omaha, Neb., where he remained until 1900 when he resigned to become chief engineer of the Morden Frog & Crossing Co. He held the latter position until 1904 when he was appointed sales engineer. In 1908, he was elected vice-president which position he has held until his death.

CANADIAN NATIONAL.—A contract for the construction of a 100-ton mechanical coaling station at Moose Jaw, Sask., has been let to the Bennet and White Construction Company, Calgary, Alta. A contract for the construction of a mechanical coaling station of similar capacity at Camrose, Alta., has been let to H. G. Macdonald & Co., Edmonton, Alta.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has applied to the Interstate Commerce Commission for authority to build on extension of about 10 miles south from Bowlegs, Okla.

CHICAGO, ROCK ISLAND & PACIFIC.—This company plans the construction of a water station with a 50,000-gal. conical bottom steel tank at Lincoln, Neb. Authorization has also been given for the construction of 15-ft. extensions to nine stalls of the roundhouse at Trenton, Mo.

DELAWARE, LACKAWANNA & WESTERN.—A contract has been let to the F. D. Hyde, Inc., of New York City, for two signal towers. One is to be located at Boonton and one at Denville, N. J. Cost of the work involved will be \$20,000. The signal towers will be two stories and will be 15 ft. 2 in. by 23 ft. 3 in. and 15 ft. 2 in. by 11 ft. respectively, and are to be of a lean-to, brick and concrete construction with slate roof.

MISSOURI-KANSAS-TEXAS.—The general contract for the construction of a one-story forge and blacksmith shop and a one-story woodworking shop at Muskogee, Okla., has been awarded to the Austin Brothers Construction Company, Austin, Tex.

MISSOURI PACIFIC.—A contract has been let to the Roberts and Schaefer Company, Chicago, for the construction of a reinforced concrete two-track coaling station of 140-tons capacity at Jefferson City, Mo.

NORTHERN CALIFORNIA.—This company has applied to the Interstate Commerce Commission for authority to build a line of 31 miles from Westwood, Calif., south

to the line of the Indian Valley, which connects with the Western Pacific at Paxton, thus forming a shorter route to Sacramento. It is proposed to acquire part of the line from the Red River Lumber Company. Willis J. Walker, San Francisco, Calif., is president.

PENNSYLVANIA.—This road plans construction work, to start soon, on a cold storage warehouse, with auxiliary equipment, at the company's new produce terminal in Philadelphia. Authorization to proceed has been given by the board of directors, and the Day & Zimmerman Engineering & Construction Company have been awarded the contract to prepare the plans and specifications for the plant. It is expected to be completed and ready for service next fall. The new warehouse will be erected over the Oregon avenue end of building C of the produce terminal, the lower or platform floor of which will continue to be used for the purpose of unloading freight. Building C, like buildings A and B, the other two structures embraced in the terminal, will be 800 ft. by 110 ft. The cold storage warehouse will extend the full width of the structure and will have a depth of 250 ft. from the Oregon avenue front. It will be eight stories high and will have a net cold storage capacity of 2,000,000 cu. ft. Every modern device for the efficient cold storage of fruits, vegetables and dairy products will be provided in this building.

ST. LOUIS-SAN FRANCISCO.—A contract for the construction of a 50-ton steel electrically operated coaling station at Memphis, Tenn., has been let to the Ogle Construction Company, Chicago.

SEABOARD ALL-FLORIDA.—The Interstate Commerce Commission has allowed an extension of time to April 1, 1928, for the completion of construction of the line in Lee County, Fla., from a connection with the Fort Myers-Estero line to Punta Rassa, under the certificate issued on November 13, 1925.



Lehigh Valley Tidewater Terminal at Jersey City

Railway Finance

BALTIMORE & OHIO.—Valuation.—The Interstate Commerce Commission has assigned the hearing on the company's protest against its tentative valuation for November 15 before Examiner Hays.

CENTRAL OF GEORGIA.—Bonds.—The Interstate Commerce Commission has granted authority to this company to procure the authentication and delivery of \$2,850,500 refunding and general mortgage 5 per cent bonds, series C, to be placed in the treasury subject to further order.

CENTRAL OF GEORGIA.—Final Valuation.—The Interstate Commerce Commission has issued its final valuation report as of 1915 finding the final value for rate-making purposes of the property owned and used for common-carrier purposes to be \$63,458,485; of the property owned but not used, \$878,184, and of the property used but not owned, \$15,743,087. The tentative valuation report showed a total of \$79,083,523 for the property used and the commission allowed some small increases. The company claimed a total of \$119,090,715.

KANSAS CITY, MEXICO & ORIENT.—Noteholders Purchase Stock.—The committee representing American holders of notes of the Kansas City, Mexico & Orient, today received in Federal Court 20,345 of the 35,000 shares of the company's stock offered to noteholders. The committee representing British note holders was allotted 14,455 shares. The remaining 200 shares went to three individuals and one brokerage firm.

The committee submitted notes totaling \$3,112,500 in face value. The British committee sent notes amounting to \$2,211,400.

F. J. Lisman & Co., New York, presenting \$16,000 in notes, received 100 shares; C. B. Ellis, Pittsburgh, Pa., with \$10,000 in notes, obtained 65 shares; W. H. Coverdale, New York, having \$5,000 in notes, got 33 shares, and William Steckel, Ellinwood, Kan., with \$300 in notes, took two shares.

The stock was over-subscribed more than twice, the bidders depositing with the clerk of the United States District Court notes having a total face value of \$5,355,200 as evidence of right to purchase the stock under a recent decision of the United States Circuit Court of Appeals. The court apportioned the stock, the price of which was fixed by the court at \$71.61, in proportion to the face value of the notes deposited by the subscribers.

NEW YORK CENTRAL.—Further Hearings on Merger Plan.—The Interstate Commerce Commission has assigned for further hearing this company's application for authority to lease the Michigan Central, Cleveland, Cincinnati, Chicago & St. Louis and the Chicago, Kalamazoo & Saginaw, and that of the Big Four for authority to lease the Cincinnati Northern and the Evansville, Indianapolis & Terre Haute. The applicants had asked a further hear-

ing to present evidence relating to the connecting short lines.

NEW YORK CENTRAL.—Chicago Junction Case Re-Opened.—The Interstate Commerce Commission has re-opened the case in which it authorized this company, in 1922, to acquire control of the Chicago River & Indiana and the Chicago Junction, for the purpose of receiving evidence proposed by the railroads as to whether the conditions of the commission's authorization should be amended by the omission of condition 14 and the insertion of a finding that the annual rental to be paid by the C. R. & I., to the C. J. is just and reasonable. The roads had asked for this change after the commission had made public its tentative valuation reports covering the properties.

PERE MARQUETTE.—Final Valuation.—The Interstate Commerce Commission has issued a final valuation report finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as of 1915 to be \$62,705,398, that of the property used but not owned to be \$3,410,305, and that of the property owned but not used to be \$559,673. The outstanding capitalization as of valuation date was \$108,837,176. After consideration of the company's protest the commission has increased the amount allowed for cost of reproduction new by \$1,726,024, but as to many items of the protest it says that the carrier's evidence is not convincing, or that the point has been decided in other cases.

Authority for Stock Dividend Denied.—The Interstate Commerce Commission, following the recommendation of its examiner, has denied this company's application for authority to issue \$9,009,200 of common stock for distribution as a 20 per cent stock dividend. After a discussion of the company's financial structure the report says: "From the above comparison it appears that the surplus of the applicant which is represented by capitalizable assets is \$6,844,561.31. Considering the financial structure of the applicant and the purposes for which surplus should be accumulated, the amount of this invested surplus is insufficient to justify distributing all or any part of it to the stockholders as a stock dividend. Moreover, as the proposed issue of stock would result in the capital liabilities exceeding the capitalizable assets, the granting of authority to issue stock for distribution as a stock dividend prior to the finding of the final valuation of the properties would not appear to be compatible with the public interest."

ST. LOUIS & O'FALLON.—Effective Date of Recapture Order Postponed.—The Interstate Commerce Commission has again postponed to December 10 the effective date of its order which directed this company to pay to the government certain sums found by the commission to represent half its net income in excess of 6 per cent on its value. It had previously post-

poned the date of payment, pending court proceedings on the company's application for an injunction.

SEABOARD AIR LINE.—Bonds.—The Seaboard All-Florida has applied to the Interstate Commerce Commission for authority to issue \$4,502,000 of first mortgage 6 per cent bonds, to be delivered to the Seaboard Air Line in payment of advances, and to join with the Florida, Western & Northern and the East & West Coast in an issue of \$1,027,000 of first mortgage 6 per cent bonds, also to be delivered to the Seaboard. Separate applications were also filed by the other companies and one by the Seaboard for authority to guarantee the bonds and to pledge them as collateral for short term loans.

Average Price of Stocks and Bonds

	Oct. 11	Last week	Last year
Average price of 20 representative railway stocks.	120.39	122.68	98.74
Average price of 20 representative railway bonds.	96.06	95.66	90.82

Valuation Reports

The Interstate Commerce Commission has issued final valuation reports finding the final value for rate-making purposes of the property owned and used for common-carrier purposes as of the respective valuation dates as follows:

FINAL REPORTS

Central of Georgia.....	\$63,458,485	1915
Bennettsville & Cheraw.	6,570	1918
	(used) 345,000	....
Pere Marquette.....	\$62,705,398	1915

Settlements for Six Months Guaranty Nearly Completed

As of September 30 the Interstate Commerce Commission had settled all but 13 of the remaining claims of carriers for the guaranty under Section 209 of the Transportation Act for the six months' period following the termination of federal control in 1920. There were 667 carriers that accepted the guaranty and their claims amounted to \$656,863,422. The cases of 134 were dismissed and 520 have now been settled. The certificates issued by the commission for the cases settled amounted to \$526,887,109, including advance and partial payments, and \$3,005,510 has been certified as advance and partial payments for the cases not settled, making the total certifications \$529,892,619. The balance payable on the unsettled cases is estimated at approximately \$830,000. In its 1921 annual report the commission estimated the amount necessary to make good the guaranty at \$536,000,000 and in later reports has adhered to that figure.

The total amount received by the commission up to September 30 for its recapture fund was \$7,140,930, of which \$5,036 was paid in September.

THE NATIONAL INDUSTRIAL TRAFFIC League will hold its annual meeting at the Palmer House, Chicago, on November 16 and 17.

Railway Officers

Executive

C. B. Sudborough, general traffic manager of the Pennsylvania, with headquarters at Philadelphia, Pa., has been appointed assistant vice-president in charge of traffic.

Sutherland Dows, vice-president of the Tama & Toledo and vice-president and general manager of the Cedar Rapids & Iowa City, with headquarters at Cedar Rapids, Iowa, has also been elected vice-president and treasurer of the Wyoming Railway.

Financial, Legal and Accounting

P. B. Lacy has been appointed assistant treasurer of the Northern Pacific, with headquarters at St. Paul, Minn.

Operating

E. C. Neal, acting trainmaster on the Atchison, Topeka & Santa Fe, has been appointed trainmaster of the First, Leavenworth, Atchison, Osage City and Lawrence districts, with headquarters at Emporia, Kan.

The Central and Southern districts of the Seaboard Air line have been consolidated and are now designated as the Southern district. **T. W. Parsons**, general superintendent of the former Southern district, with headquarters at Arcadia, Fla., has been appointed general superintendent of the new Southern district, with headquarters at Jacksonville, Fla. **G. R. Carlton**, general superintendent of the Western district, with headquarters at Savan-

nah, Ga., has been transferred, in the same capacity, to the Northern district, with the same headquarters, succeeding **G. V. Peyton**, who has been relieved, at his own request, due to ill health. **E. C. Bagwell**, general superintendent of the Central district, with headquarters at Jacksonville, Fla., has been transferred in the same capacity to the Western district, with headquarters at Savannah, Ga., succeeding Mr. Carlton.

Mechanical

A. J. Poole has been appointed mechanical assistant of the Tennessee Central, with headquarters at Nashville, Tenn.

H. H. Hummel, chief clerk to the general superintendent of motive power of the Southern Pacific, has been promoted to assistant to the general superintendent of motive power, with headquarters at San Francisco, Cal.

W. M. Moore, assistant road foreman of engines of the Virginia division of the Seaboard Air Line, with headquarters at Raleigh, N. C., has been appointed supervisor of motor car operation, and will be succeeded by **W. W. Shoemaker**.

Ralph W. Anderson, who has been appointed superintendent of motive power of the entire system of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., was born in Madison county, Iowa, on May 6, 1877, and entered railway service as a machinist's apprentice on the Des Moines Union at Des Moines, Iowa, in January, 1892. After five years with the Des Moines Union Mr. Anderson became a ma-

chinist on the Chicago, Rock Island & Pacific, later being advanced through the position of assistant roundhouse foreman to roundhouse foreman. His service with the Milwaukee began in September, 1906, when he became a machinist at Mitchell, S. D. In the following year he was promoted to assistant roundhouse foreman at Mitchell, where he remained until September, 1907, when he was transferred to the Idaho division as a machinist. Mr. Anderson was advanced to mechanical



R. W. Anderson

foreman of the Idaho division in June, 1908, and from May, 1909, to November, 1912, he served as roundhouse foreman at Avery, Idaho, and Miles City, Mont. At the end of that time he was promoted to master mechanic, with headquarters at Miles City, where he remained until June, 1918, when he was again promoted to assistant superintendent of motive power of the Eastern lines, with headquarters at Milwaukee. In June, 1920, he was advanced to superintendent of motive power of the Eastern lines, a position he held until his jurisdiction was extended to cover the system.



The Lehigh Valley's "Black Diamond" Along the Susquehanna River

Traffic

C. H. Witt, has been appointed general agent of the Cleveland, Cincinnati, Chicago & St. Louis and the Evansville, Indianapolis & Terre Haute at Terre Haute, Ind.

Joseph H. McCabe who has been promoted to assistant freight traffic manager of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, was born on November 20, 1873, at Washington, D. C., and received his first training in railway work as an office boy in the auditing department of the Santa Fe in 1887. After a variety of experi-



J. H. McCabe

ence in the auditing department he became a clerk in a local freight office of the Santa Fe in 1891, where he remained until 1898 when he was transferred to the refrigerator department. In 1900 he was again transferred to the general freight department, becoming chief clerk of that department in 1913. Mr. McCabe was promoted to assistant general freight agent on March 1, 1920, and to general freight agent on July 15, 1922, remaining in the latter position until his promotion to assistant freight traffic manager on October 1. Mr. McCabe's entire railroad service has been with the Santa Fe in Chicago.

A. L. Ives, city passenger agent on the Union Pacific at Seattle, Wash., has been promoted to general agent in the passenger department, with headquarters at the same point.

E. J. Schmidt, chief of tariff bureau of the Chicago & Eastern Illinois, with headquarters at Chicago, has been appointed general coal agent, with headquarters at the same point, succeeding **G. H. Kummer**, deceased.

J. A. Shields, district passenger agent of the Quebec Central, with Headquarters at Boston, Mass., has been appointed general agent, with headquarters at Sherbrooke, Que. Mr. Shields will also perform duties as may be assigned to him in connection with the claims department.

Joseph H. Desherow, general agent of the Southern Pacific, with headquarters

at Minneapolis, Minn., has been appointed general agent in the passenger department, with headquarters at Chicago, succeeding **Alvin C. Hedlund**, promoted. **Robert K. Smith** has been appointed general agent at Minneapolis, succeeding Mr. Desherow.

T. D. Moss, division passenger agent on the Missouri Pacific at Memphis, Tenn., has been promoted to assistant general passenger agent, with headquarters at the same point, a newly created position. **J. M. Bryan**, traveling passenger agent at Memphis, has been promoted to general agent for the freight and passenger departments at Nashville, Tenn., a newly established agency. **C. C. Hart**, traveling freight agent at Memphis, has been promoted to general agent for the freight and passenger departments at Chattanooga, Tenn., a newly established agency.

Roy G. Nicholson, who has been promoted to general freight agent of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, was born on October 10, 1882, at Milwaukee, Wis., and entered railway service at the age of 16 years as a clerk on the Wisconsin Central (now leased to the Minneapolis, St. Paul & Sault Ste. Marie). Mr. Nicholson's first service with the Santa Fe began in 1900 when he became a stenographer and clerk in the commercial agent's office at Milwaukee. In 1902 he left railway service, returning in 1905 to the office of the commercial



R. G. Nicholson

agent of the Santa Fe at Milwaukee, where he remained until 1907 when he was transferred to the freight department at Chicago. Here Mr. Nicholson advanced successively through the positions of claim clerk, rate clerk, chief rate clerk, assistant chief clerk and chief clerk, being promoted to assistant general freight agent, with headquarters at Chicago, in July, 1922. He held this position until his promotion to general freight agent on October 1.

Walter B. Wells, who has been promoted to assistant freight traffic manager of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., entered railway service on the Frisco in July,

1891, as an office boy in the office of the auditor. After several years of service in the accounting department Mr. Wells was transferred to the traffic department, advancing successively through the positions of contracting freight agent at St. Louis, traveling freight agent in Texas, commercial agent at Dallas, Tex., industrial agent at St. Louis and general agent at Dallas. In 1920 Mr. Wells was appointed general freight agent of the Ft. Worth & Rio (a subsidiary of the Frisco), with headquarters at Ft. Worth, Tex., where he remained until August 1, 1923, when he was appointed general agent of the Frisco at Chicago. He remained as general agent at Chicago until his promotion to assistant freight traffic manager on October 3. During federal control of the railroads Mr. Wells served as corporate vice-president of the Ft. Worth & Rio Grande.

J. B. Large, assistant general traffic manager of the Pennsylvania, with headquarters at Philadelphia, Pa., has been appointed general traffic manager, with the same headquarters, succeeding **C. B. Sudborough**, promoted. **C. T. Mackenson, Jr.**, freight traffic manager of the Eastern region, with headquarters at Philadelphia, has been appointed assistant general traffic manager, with the same headquarters, succeeding Mr. Large. In his new position he will be particularly charged with responsibility for merchandise and general freight traffic other than coal. **J. T. Carbine**, coal traffic manager of the Central region, with headquarters at Pittsburgh, Pa., has also been appointed assistant general traffic manager, with headquarters at Philadelphia, with particular responsibility for supervision over the general coal traffic of the Pennsylvania. **C. H. Mathews, Jr.**, general passenger agent of the Eastern region at Philadelphia, has also been appointed an assistant general traffic manager, with responsibility for general supervision over the passenger traffic of the System. **William R. Cox**, coal and ore agent at Cleveland, O., has been appointed coal traffic manager of the Central region at Pittsburgh, succeeding Mr. Carbine. **W. C. Glynn**, freight traffic manager of the Central region, with headquarters at Pittsburgh, has been appointed to a similar position on the Eastern region at Philadelphia. **H. C. Oliver**, general freight agent of the Central region, with headquarters at Pittsburgh, has been appointed freight traffic manager of the same region, with the same headquarters, succeeding Mr. Glynn. **William M. Pomeroy**, assistant general freight agent of the Central region at Pittsburgh, has been appointed general freight agent of that region, succeeding Mr. Oliver.

Engineering, Maintenance of Way and Signaling

C. M. Cannon, district engineer maintenance of way of the Southern district of the Seaboard Air Line, with head-

quarters at Arcadia, Fla., has been appointed division engineer of the South Florida division, with the same headquarters, succeeding **G. C. Ruskell**, transferred.

Obituary

N. A. Stedman, formerly—1894-1896—a member of the Railroad Commission of Texas and for some years attorney for the Texas General Managers' Association, died at his home in Austin, on September 14, at the age of 73.

George E. Woodward, former general agent for the New York, New Haven & Hartford, died on October 12 at his home in West Brookfield, Mass., after a long illness at the age of 59. He retired 12 years ago because of failing health.

Arthur Campbell Shaw, chief compiler of public time tables of the Canadian Pacific, with headquarters at Montreal, Que., died in that city on October 1. Mr. Shaw had been in the employ of the C. P. R. for 43 years, serving from 1900 to 1910 as general agent in the passenger department at Chicago, and from 1910 to 1916 as assistant general passenger agent and general passenger agent, with headquarters at Winnipeg, Man. He had been chief compiler of public time tables since 1916.

Frank Deming Stout of Chicago, president of the Missouri Southern, died of heart disease at a hospital at Rice Lake, Wis., on October 11, following an illness of several months. Mr. Stout was born in March, 1854 at Dubuque, Iowa, and became president of the Missouri Southern, with headquarters at

Leeper, Mo., in 1904. He relinquished this office for a short time in 1905 and 1906 and when he again became president in the latter year he moved his headquarters to Chicago. At the time of his death, Mr. Stout was a director in the California & Oregon Lumber Co., and the Illinois Merchants Trust Company.

James M. Schoonmaker, chairman of the board of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., died on October 11 at the age of 86 after an operation for appendicitis. Mr. Schoonmaker was born in Pittsburgh in 1842 and was a student at the University of Pittsburgh when the Civil War began. He served in the war and after he was mustered out from the service was engaged in the mining and shipping of coal from the new fields along the Monongahela river down the Ohio river. He later became associated with the Pittsburgh & Lake Erie and not long after became vice-president and still later chairman of the board.

Paulino Fontes, former general director of the National Railways of Mexico, was executed near Jalapa, V. C., along with a party of his followers for his opposition to the regime of President Calles of Mexico on October 9. General Fontes became general manager of the Mexican Railway in 1918 and in the following year was appointed general director of the National Railways of Mexico, and acting general manager of the Mexican and the Southeastern Lines of Mexico (most of which lines are now parts of the National Railways). His service with the National Railways and the Southeastern Lines was concluded late in 1919 although he continued as acting general manager of the Mexican through 1920.

Charles Yoder, engineer of maintenance of way of the lines of the New York Central west of Buffalo, who died on September 29 at Cleveland, Ohio, was born on November 24, 1873, at Madisonburg, Ohio. After attending Mt. Union College, Alliance, Ohio, from 1888 to 1891, Mr. Yoder entered railway service during 1892, as a rodman on the Lake Shore & Michigan Southern (now a part of the New York Central). The following year he was advanced to a levelman, then serving as a clerk in the office of the roadmaster from 1896 to 1898. On April 26, 1898, Mr. Yoder enlisted in the army for the period of the Spanish American war, returning to railway service as a roadmaster on the L. S. & M. S. in July, 1899. From March, 1901, to January, 1903, he served as roadmaster on the Lake Erie & Western (now a part of the New York, Chicago & St. Louis), later returning to the L. S. & M. S. in the same capacity. Mr. Yoder was promoted to engineer of track on the L. S. & M. S. and the western lines of the N. Y. C. in June, 1905, a position he held for nearly 19 years until his appointment as engineer of maintenance of way of the lines of the New York Central west of Buffalo, with headquarters at Cleveland, on April 1, 1924. He remained in the latter position until the time of his death.

THE COMMISSIONER OF AGRICULTURE of the State of Georgia announces that the state bureau of markets is to have on its staff a specialist to devote his time to freight rates. The agricultural department has filed with the Southeastern classification committee a vigorous protest against many items in the proposed new freight tariffs which are now under consideration by the railroads.



The "Orange Colored Horse"

One of Two S. A. L. Locomotives Specially Decorated to Handle Special Trains of American Legionnaires. Red, white and blue driving wheels had half-inch gold stripes down the spokes. The steam dome and sand dome were in orange, topped with blue and two-inch red stripes. The main engine frame was black, and the boiler jacket was in gray enamel. The tank was in olive drab and the smoke box orange. The smokestack was orange with two-inch red stripe and an American flag on each side. Lower part of the firebox was in silver aluminum, and many parts of the locomotive were picked out in gold bronze and silver. The engine tank was blue in front, and on the sides bearing a large American Legion emblem on each side in orange. The cylinder heads were orange trimmed in red, and the cylinder casings gold with "Toot Sweet" in blue letters.